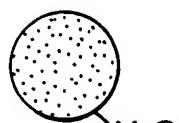
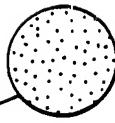


## FIG. 1

TOPCAT-BESTB0001



[ SEQ. ID NO: 3]

X-C-C-T-T-G-A-G-A-T-T-T-C-C-C-T-C  
5' 3'G-G-A-A-C-T-C-T-A-A-A-G-G-G-A-G-X  
3' 5'

[ SEQ. ID NO: 4]

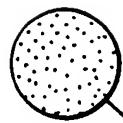
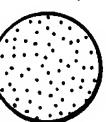
X-C-C-T-T-G-A-G-A-T-T-T-C-C-C-T-C  
G-G-A-A-C-T-C-T-A-A-A-G-G-G-A-G-X

FIG. 2

TECHNICON INSTRUMENTS

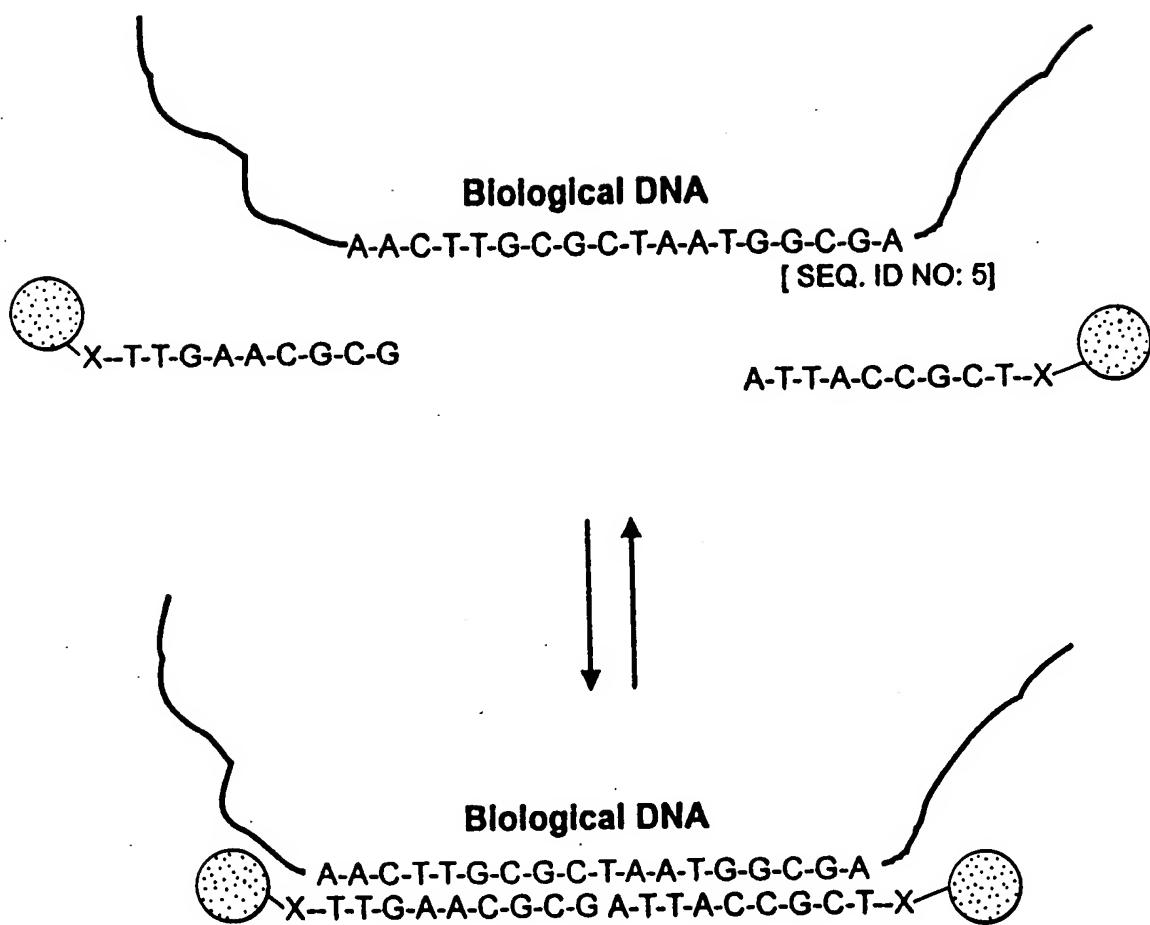
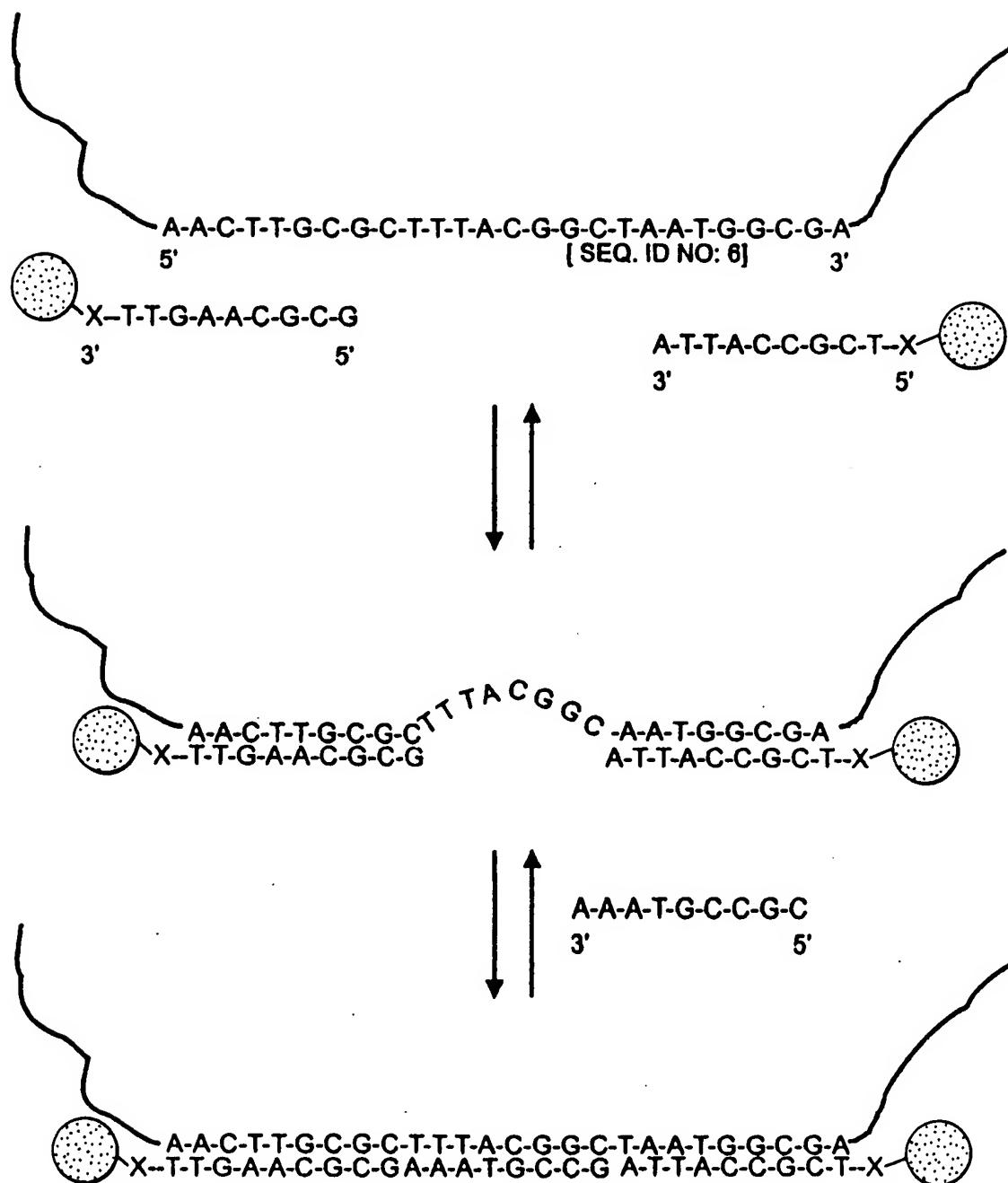
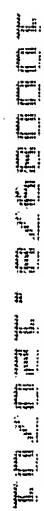
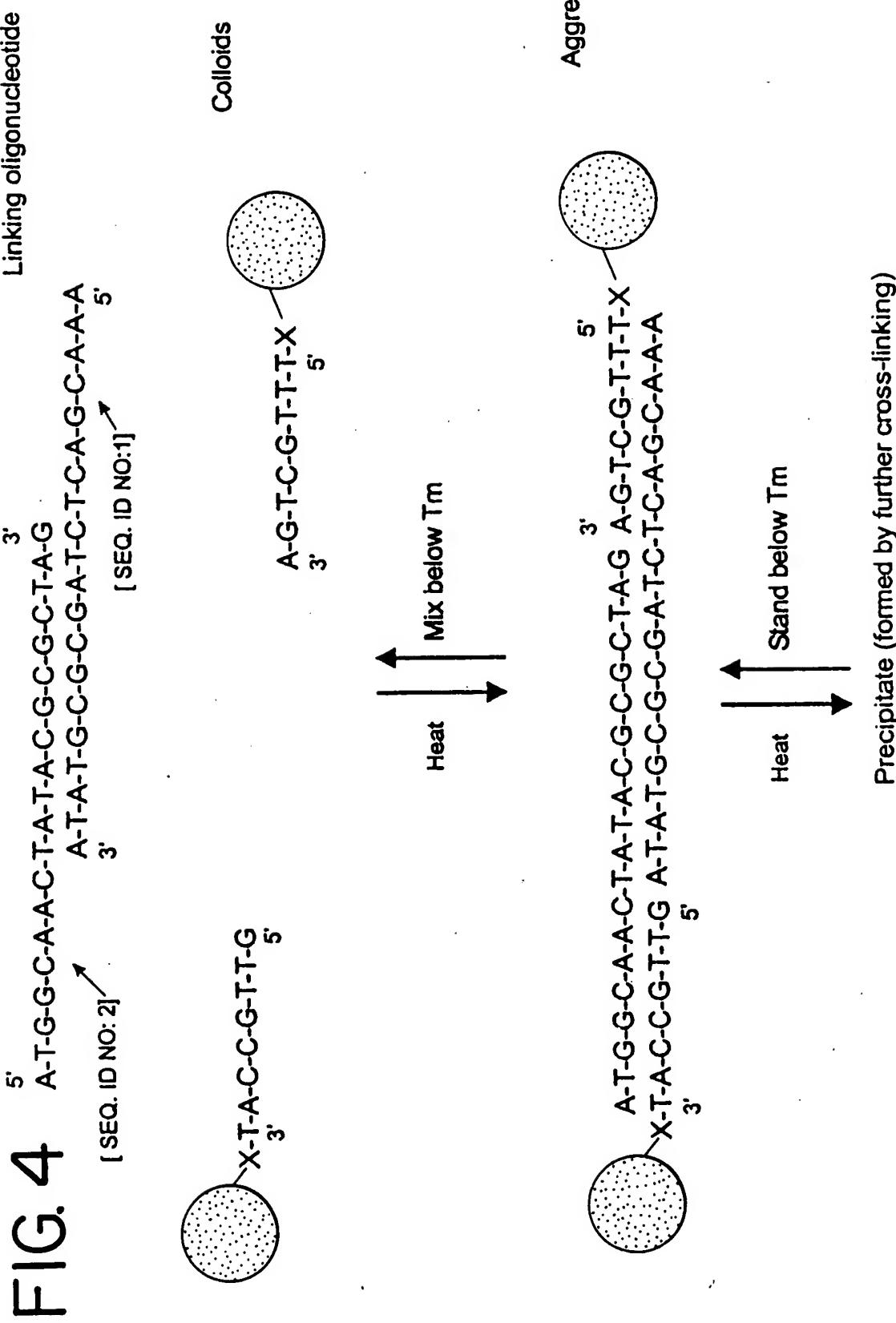


FIG. 3





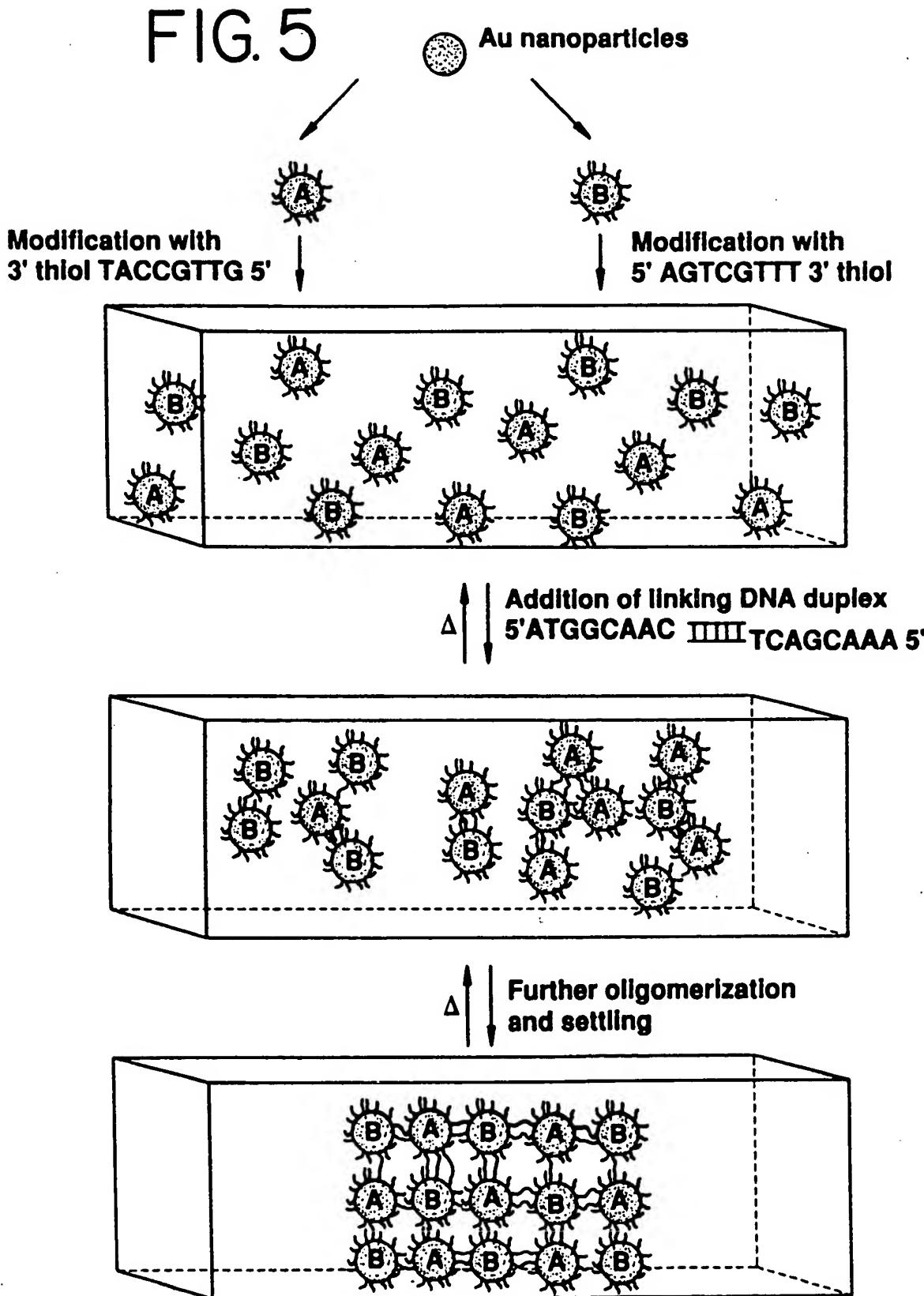


FIG.6A FIG.6B FIG.6C

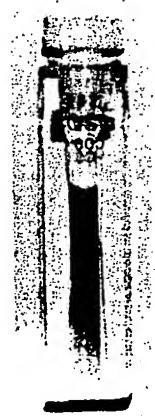


FIG. 7

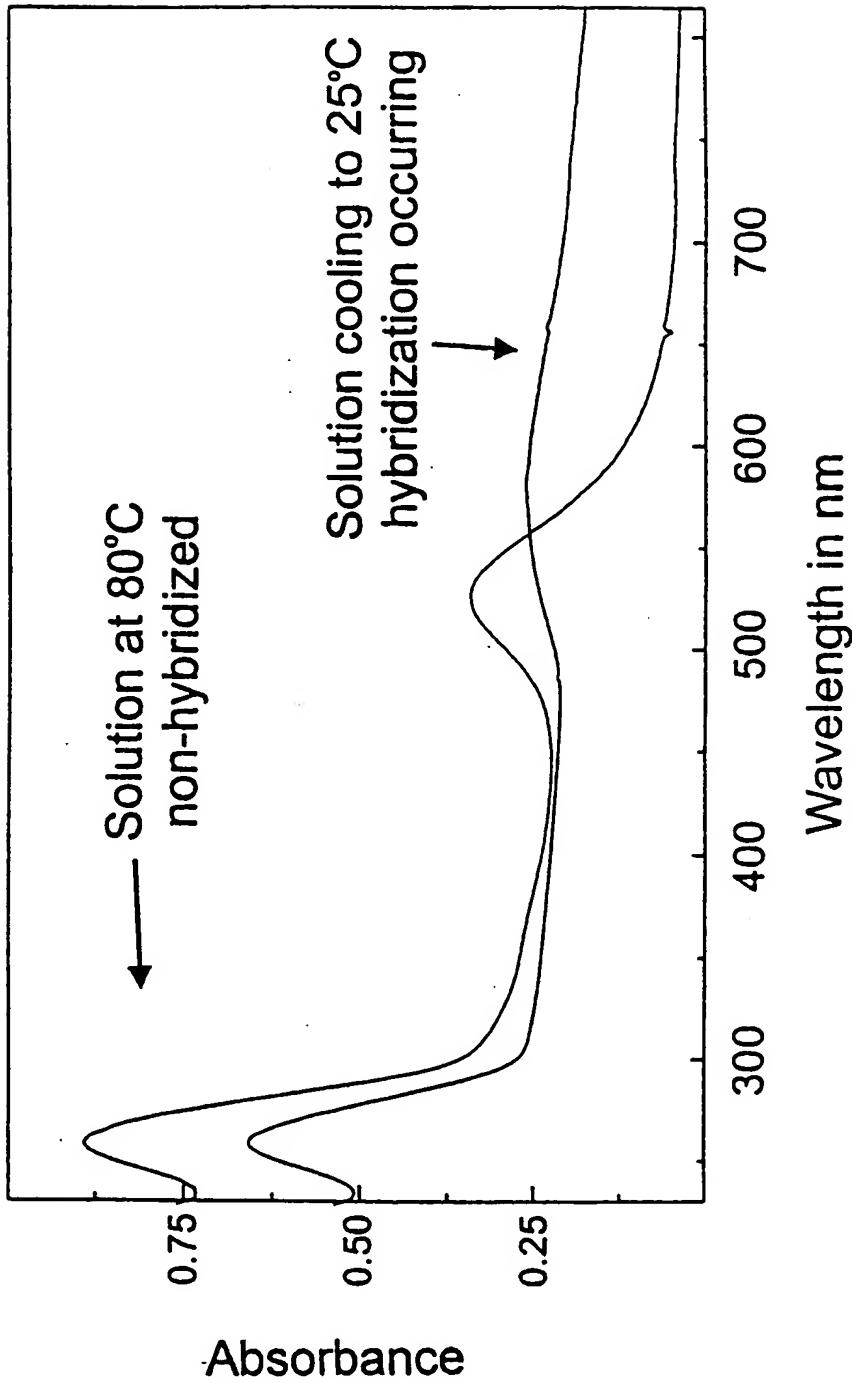


FIG. 8A

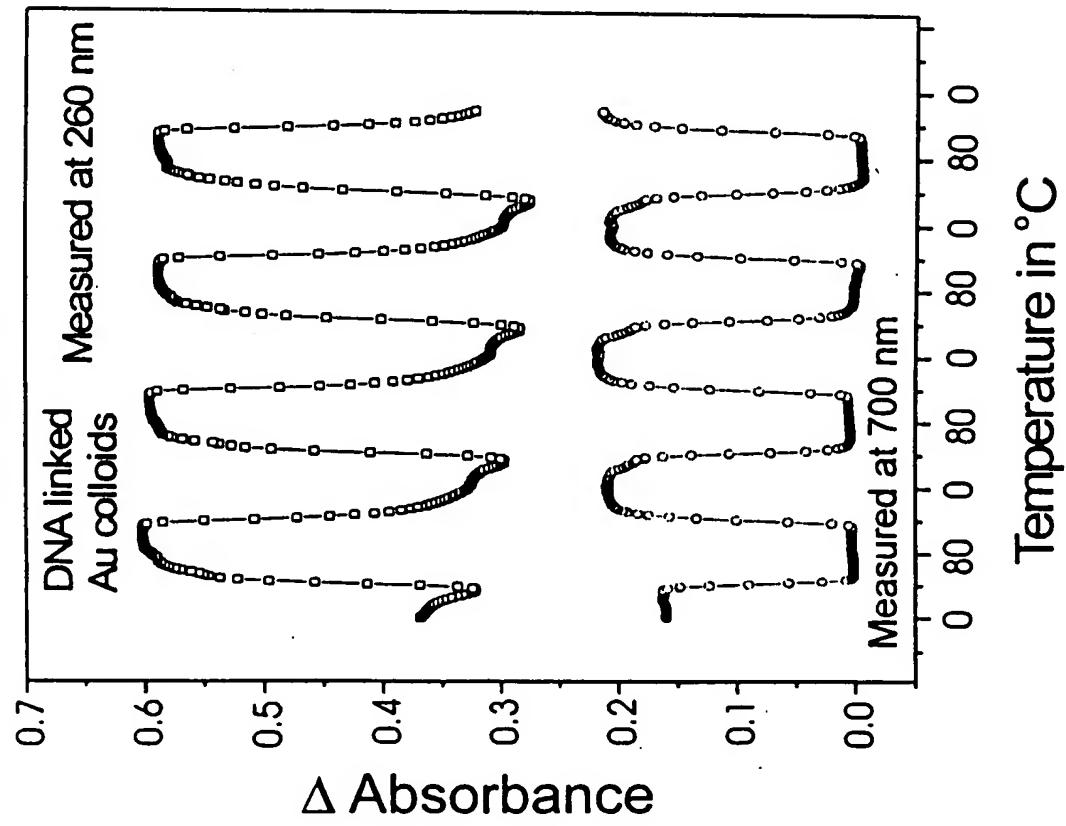


FIG. 8B

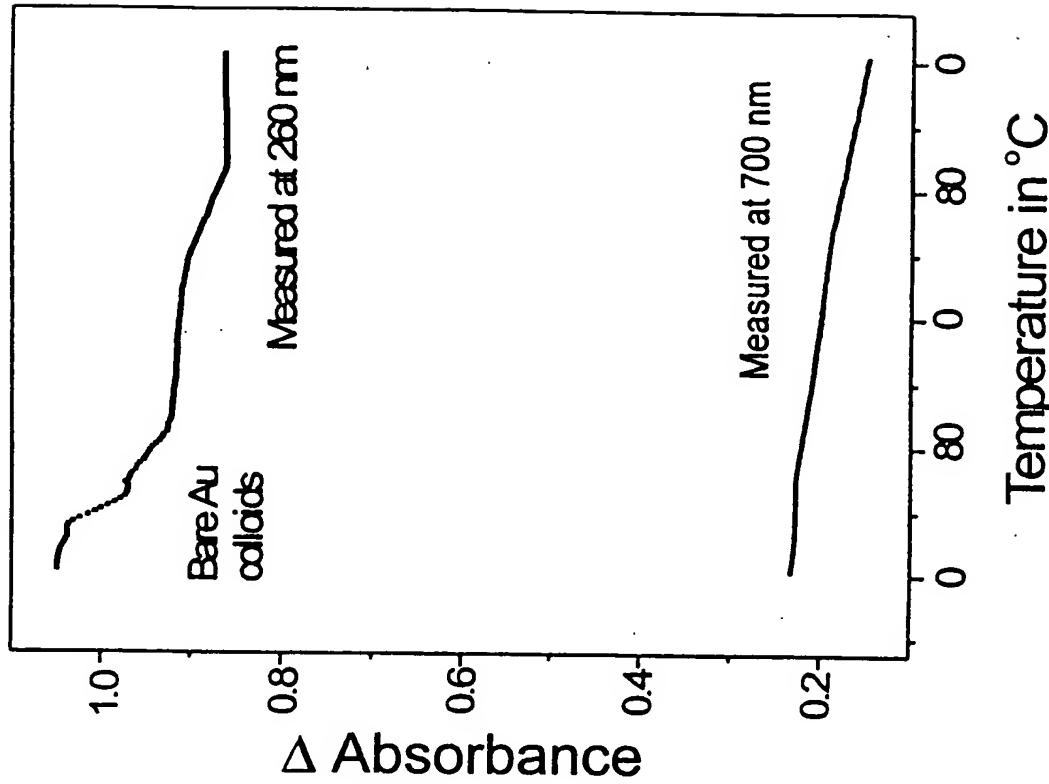


FIG. 9A

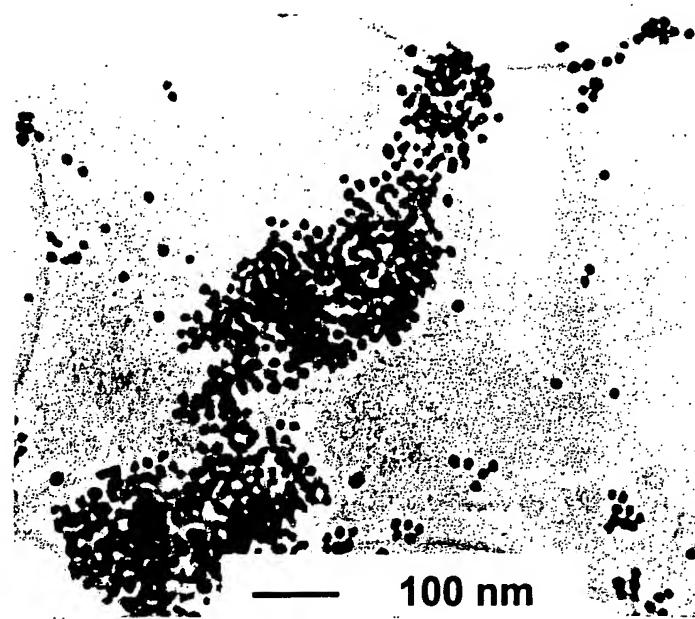
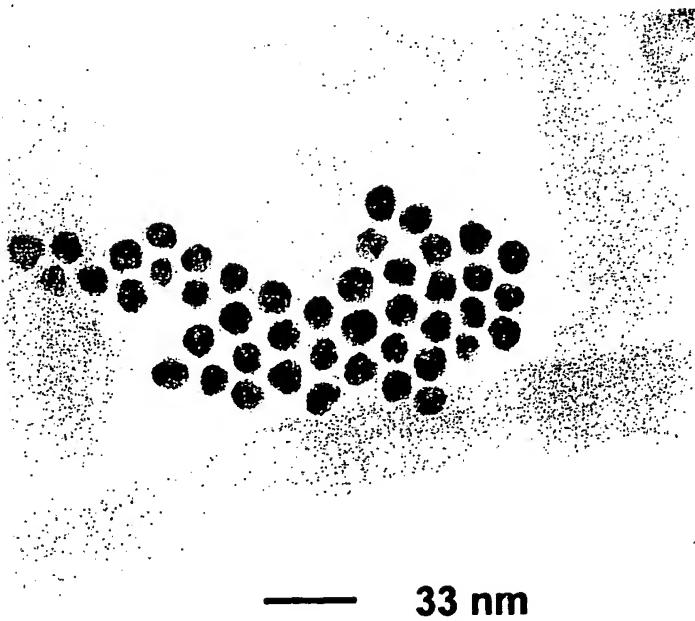
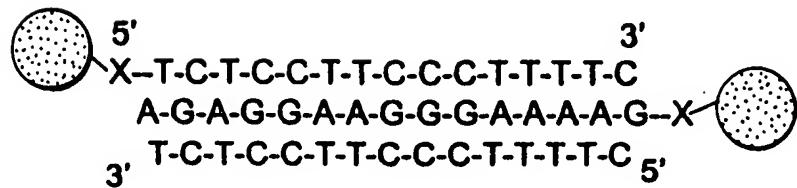
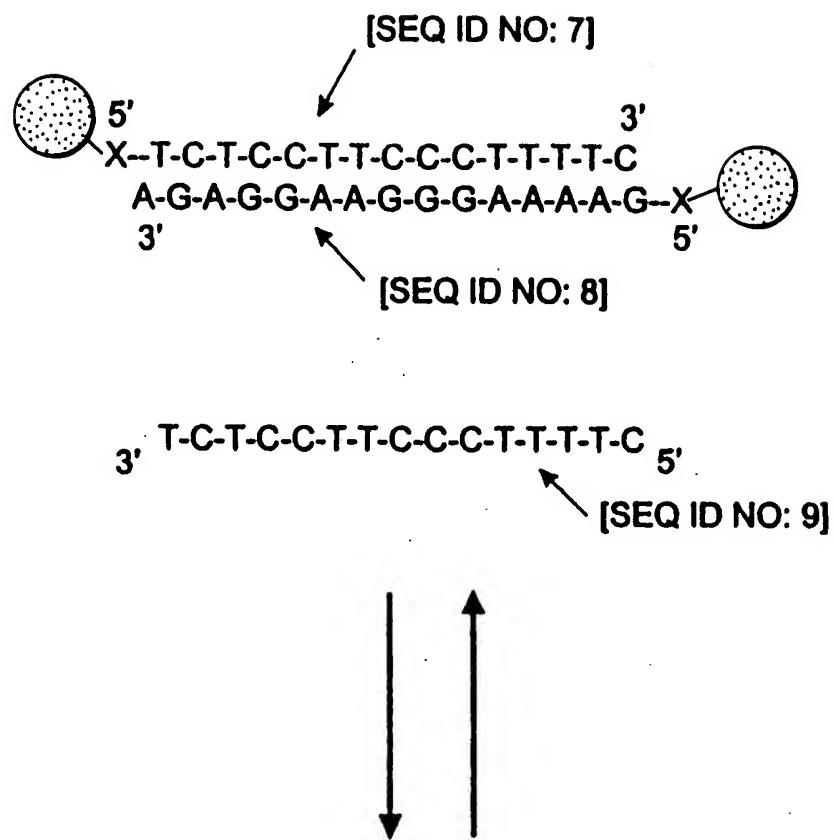


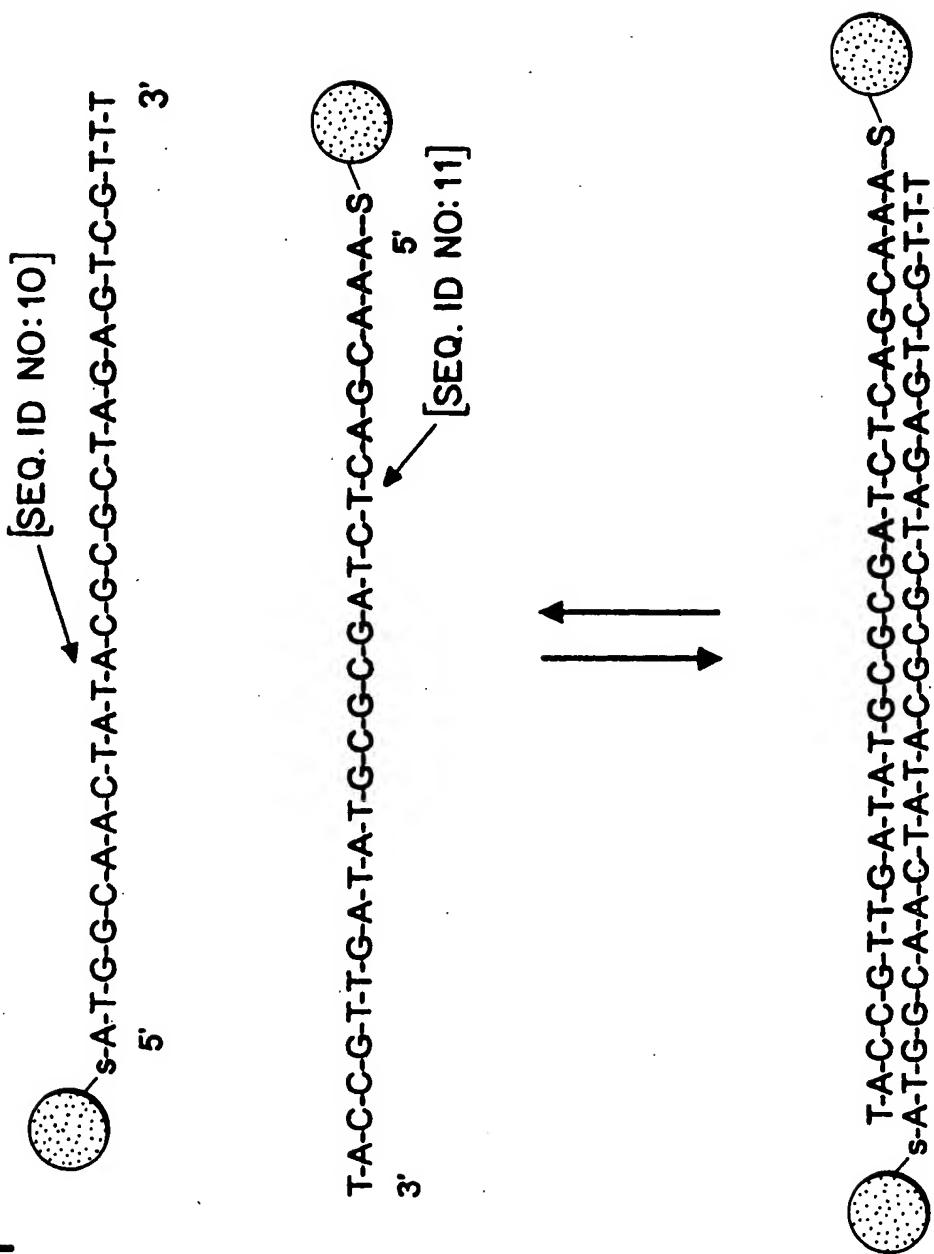
FIG. 9B



## FIG. 10



# FIG. II





## FIG. 13A

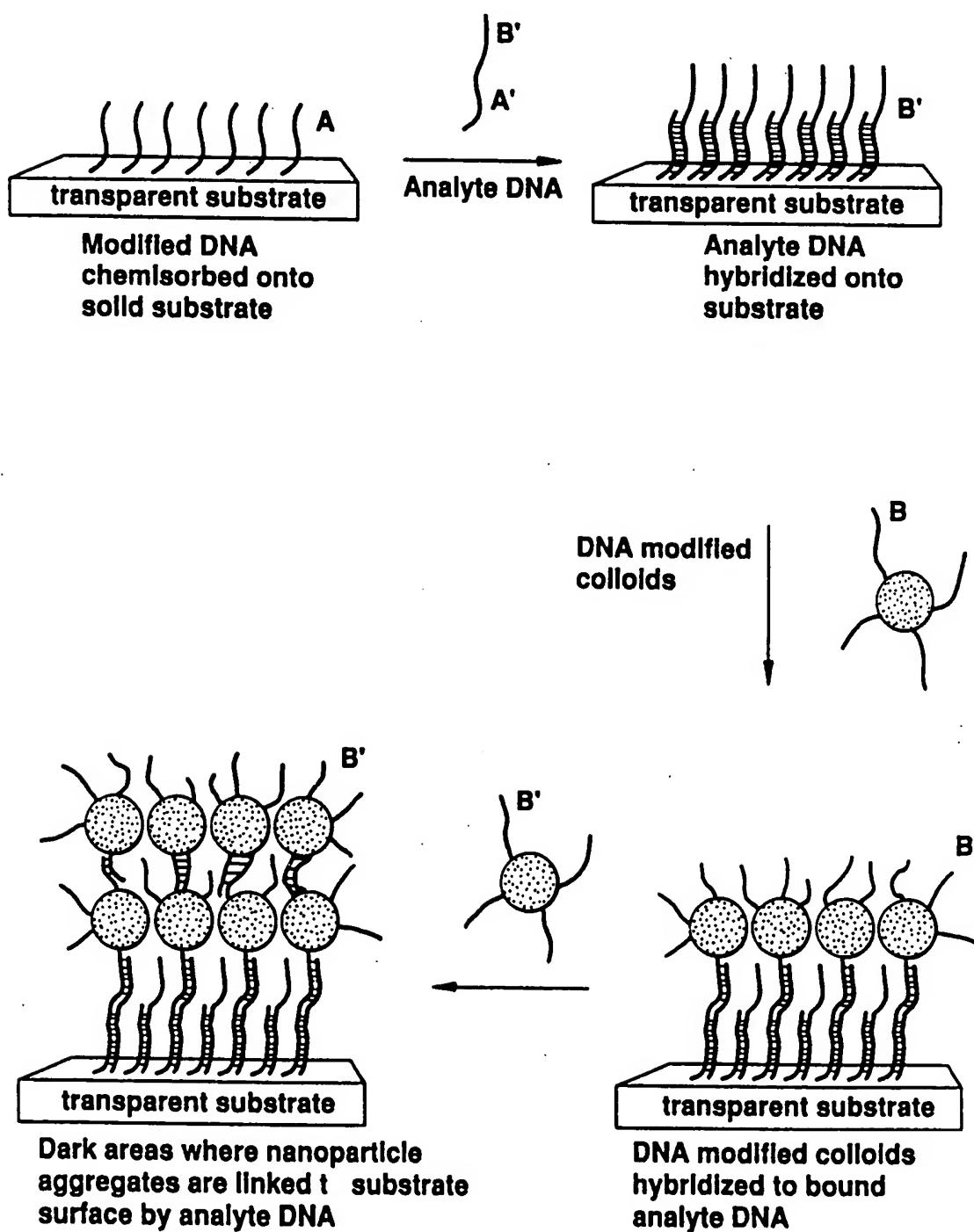


FIG. 13B

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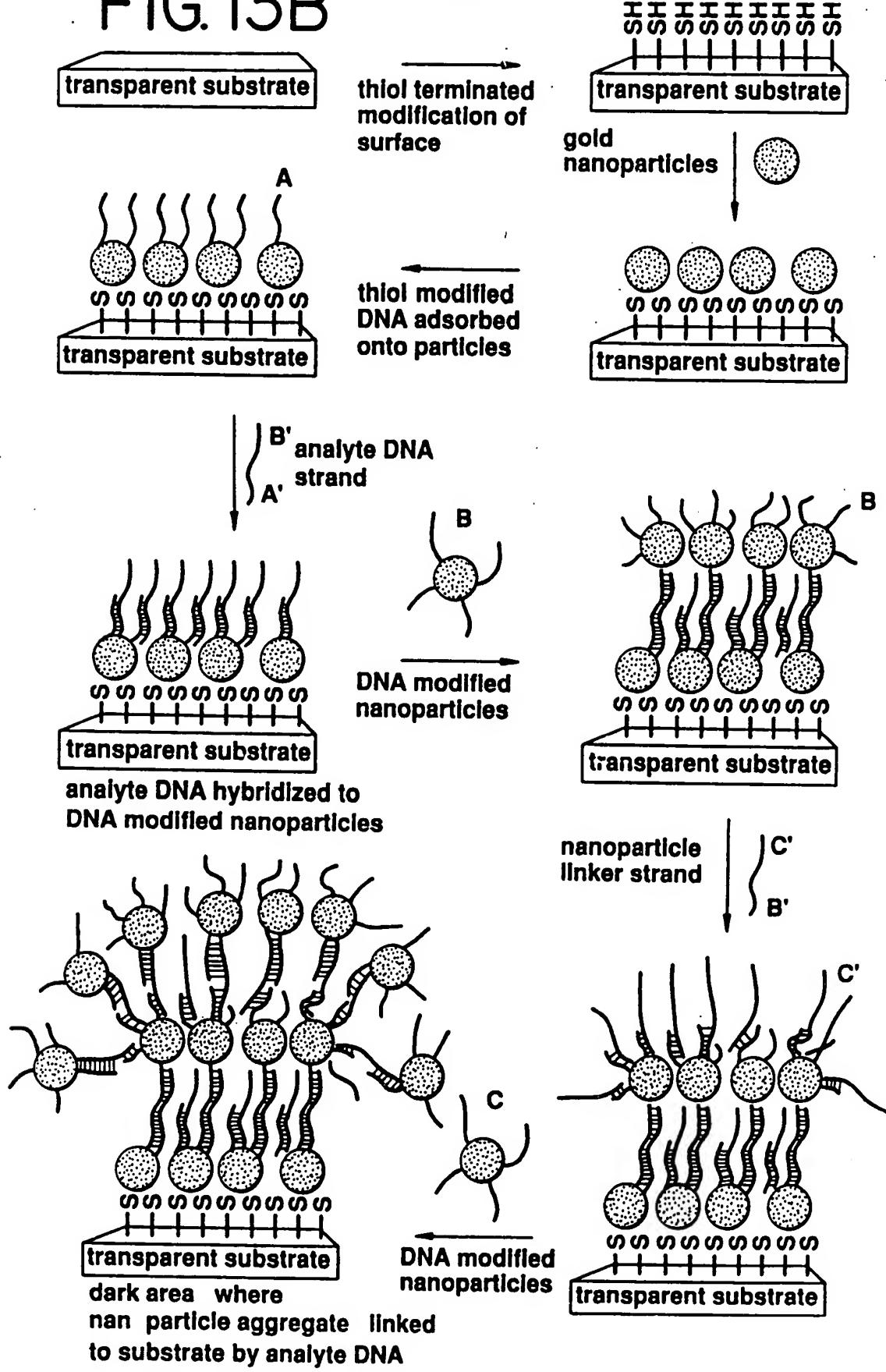


FIG. I4A

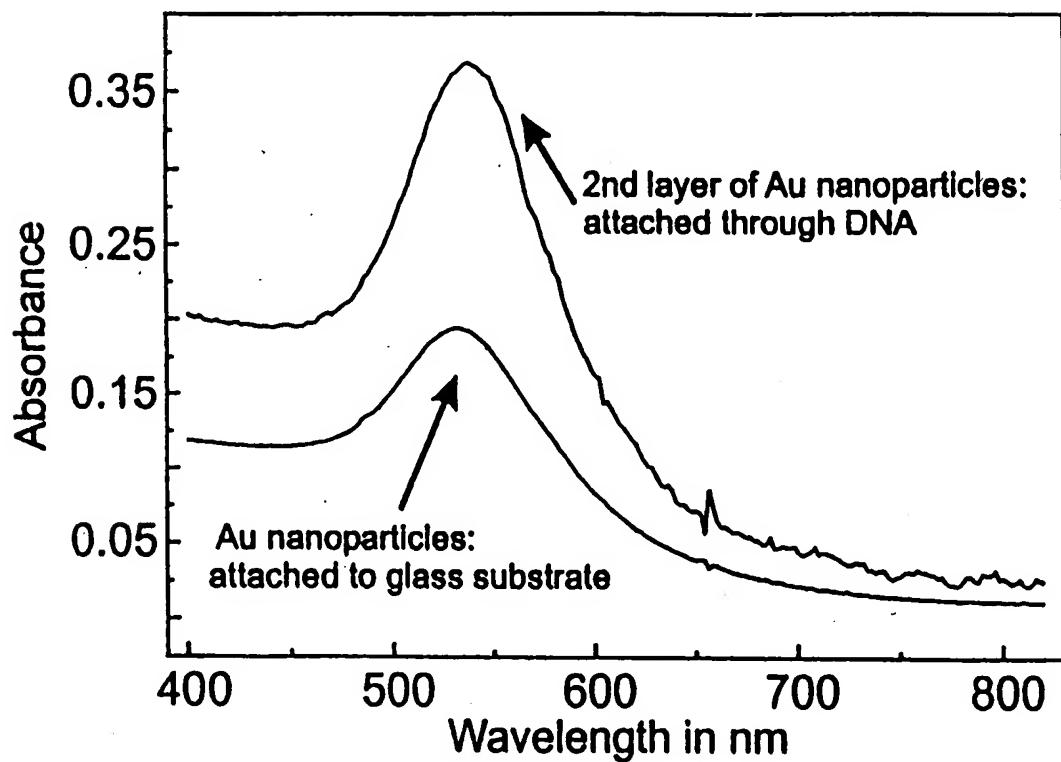


FIG. I4B

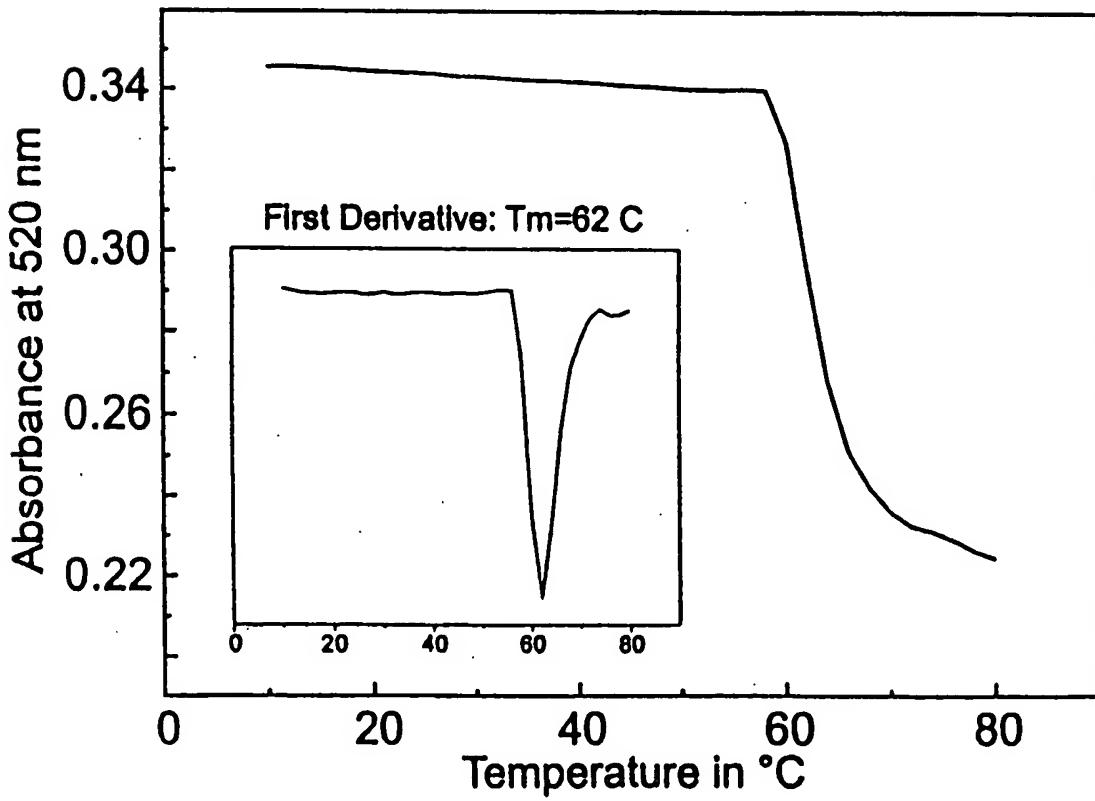


FIG. 15A

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Probes with N Target

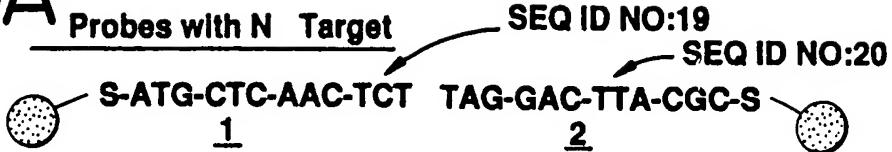


FIG. 15B

Half-Complementary Target

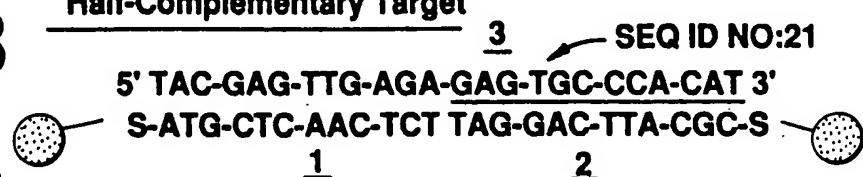


FIG. 15C

Complementary Target

Tm=53.5°C

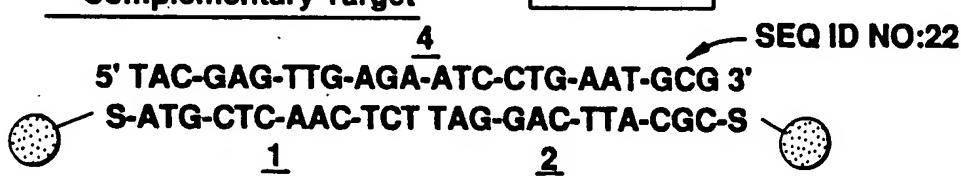


FIG. 15D

ONE Base-Pair Mismatch at Probe Head

Tm=50.4°C

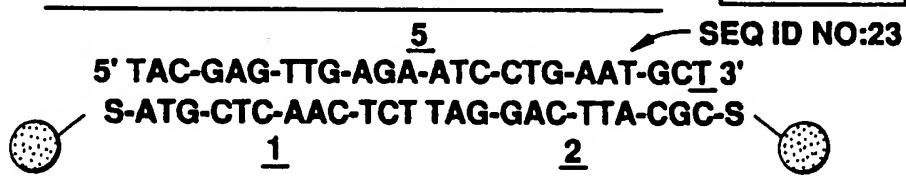


FIG. 15E

ONE Base-Pair Mismatch at Probe Tail

Tm=46.2°C

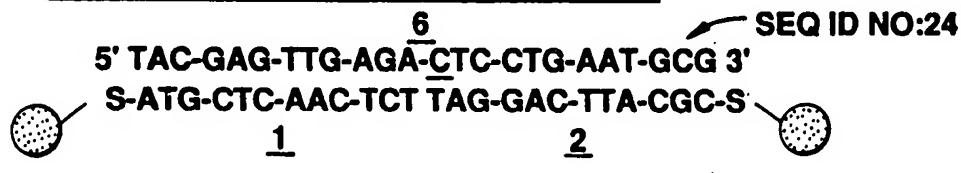


FIG. 15F

ONE Base Deletion

Tm=51.6°C

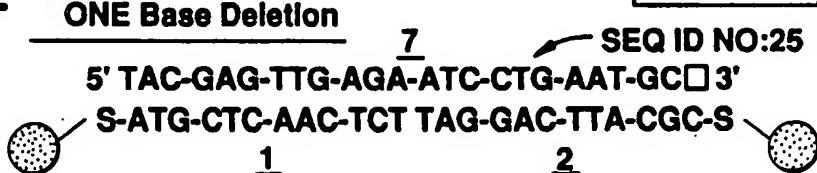
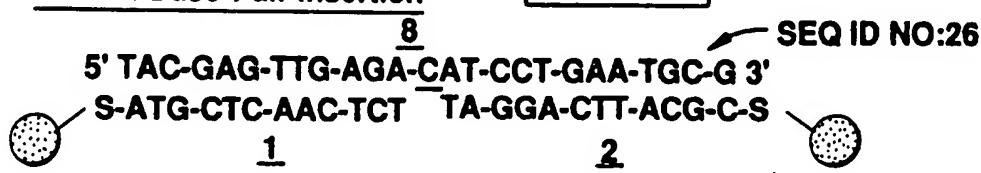


FIG. 15G

ONE Base-Pair Insertion

Tm=50.2°C



## FIG. 16A

### 24 Base Template

5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCG 3'  
-S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S -  
1  
2

## FIG. 16B

### 48 Base Template with Complementary 24 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-ATC-CTG-AAT-GCG 3'  
-S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT TAG-GAC-TTA-CGC-S -  
1  
2

## FIG. 16C

### 72 Base Template with Complementary 48 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-TAT-ATT-GGA-CGC-TTT-ACG-GAC-AAC-ATC-CTG-AAT-GCG 3'  
-S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT-TAA-CTT-GCG-AAA-TGA-TAA-CCT-GCG-TTA-GAC-TTG TAG-GAC-TTA-CGC-S -  
1  
2

FIG. 17A

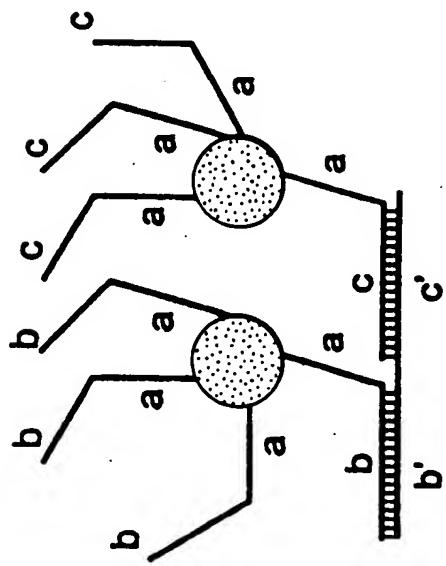


FIG. 17B

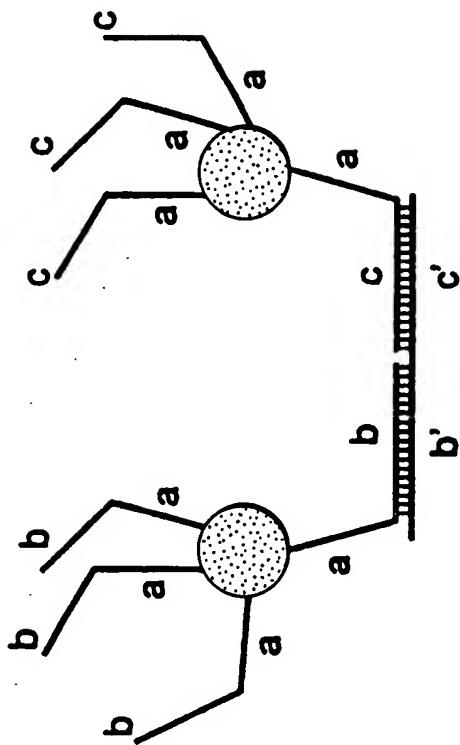


FIG. 17C

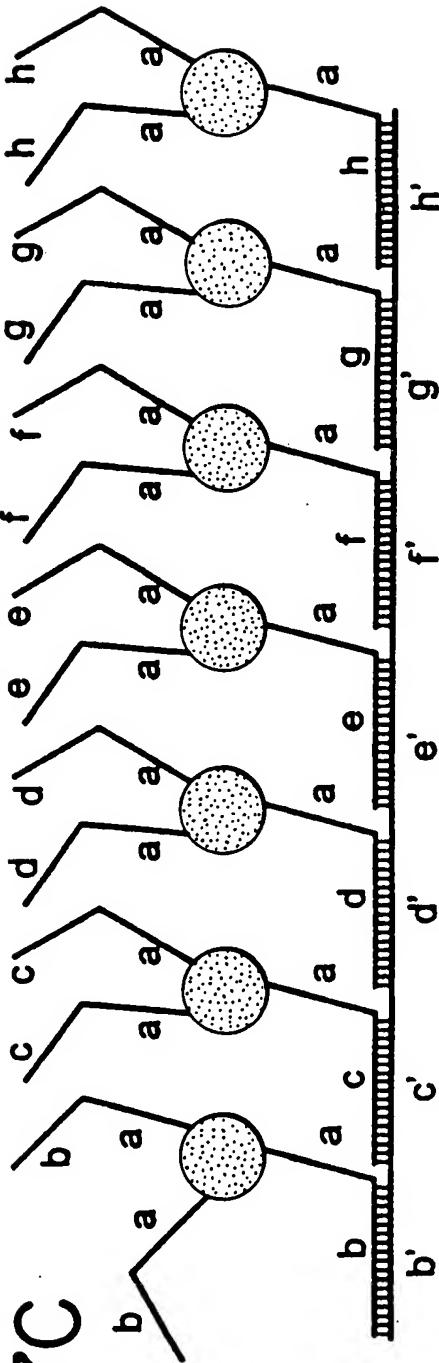


FIG. 17D

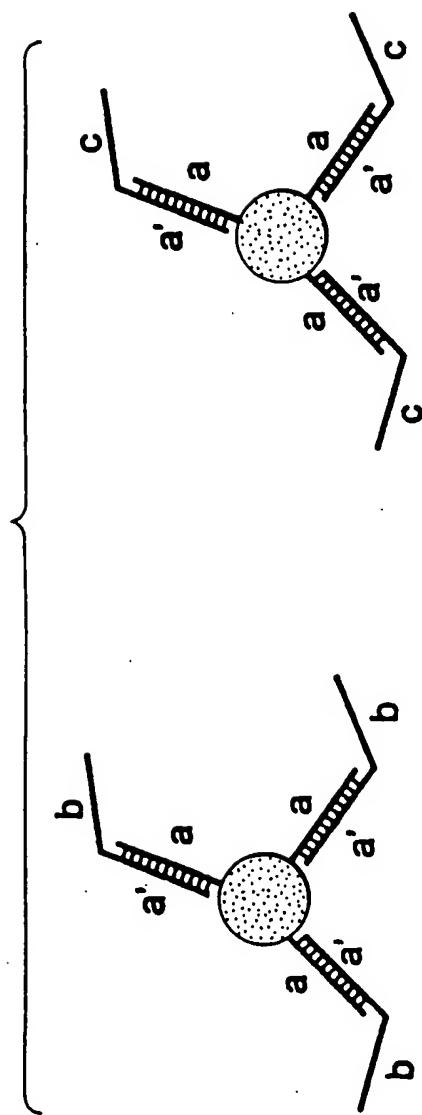


FIG. 17E

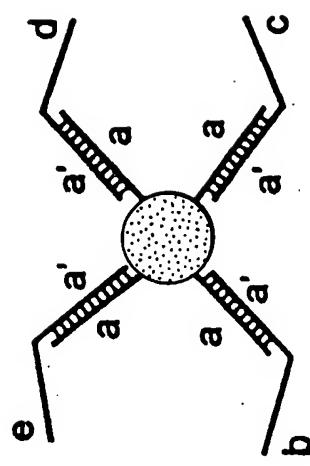


FIG. 18

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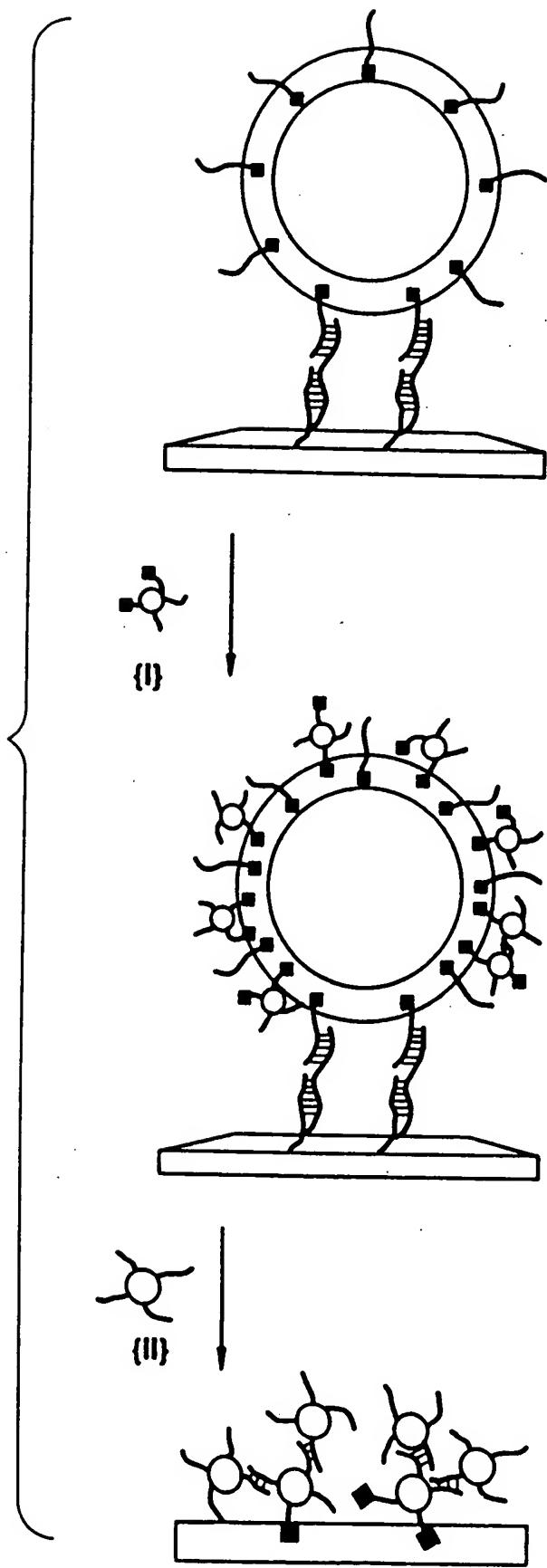


FIG. 19A

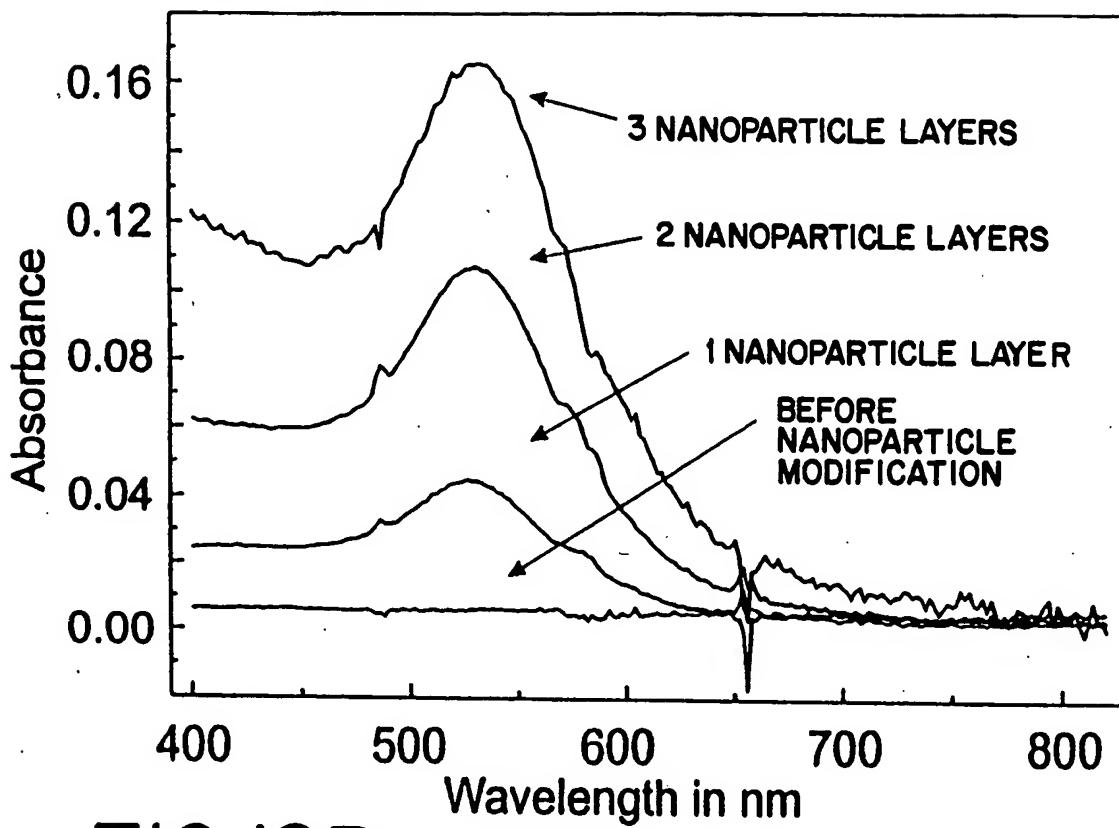


FIGURE 19B

FIG. 19B

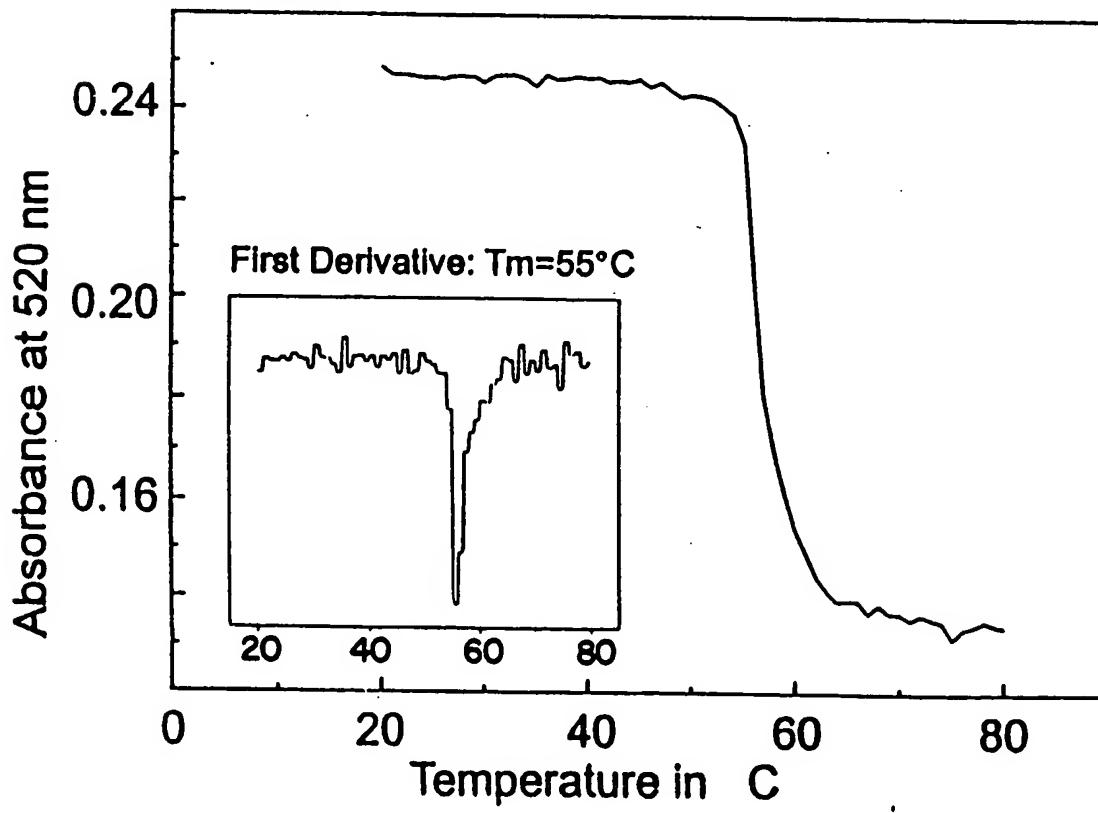


FIG. 20A

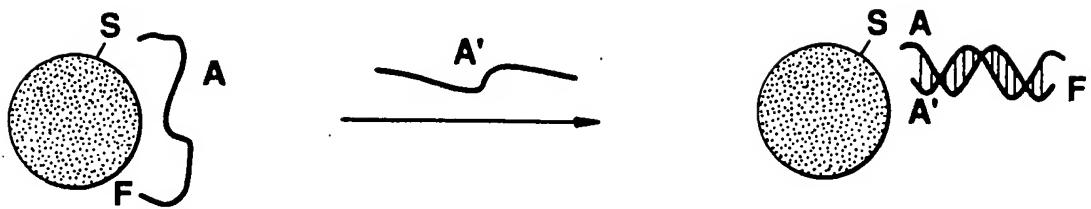


FIG. 20B

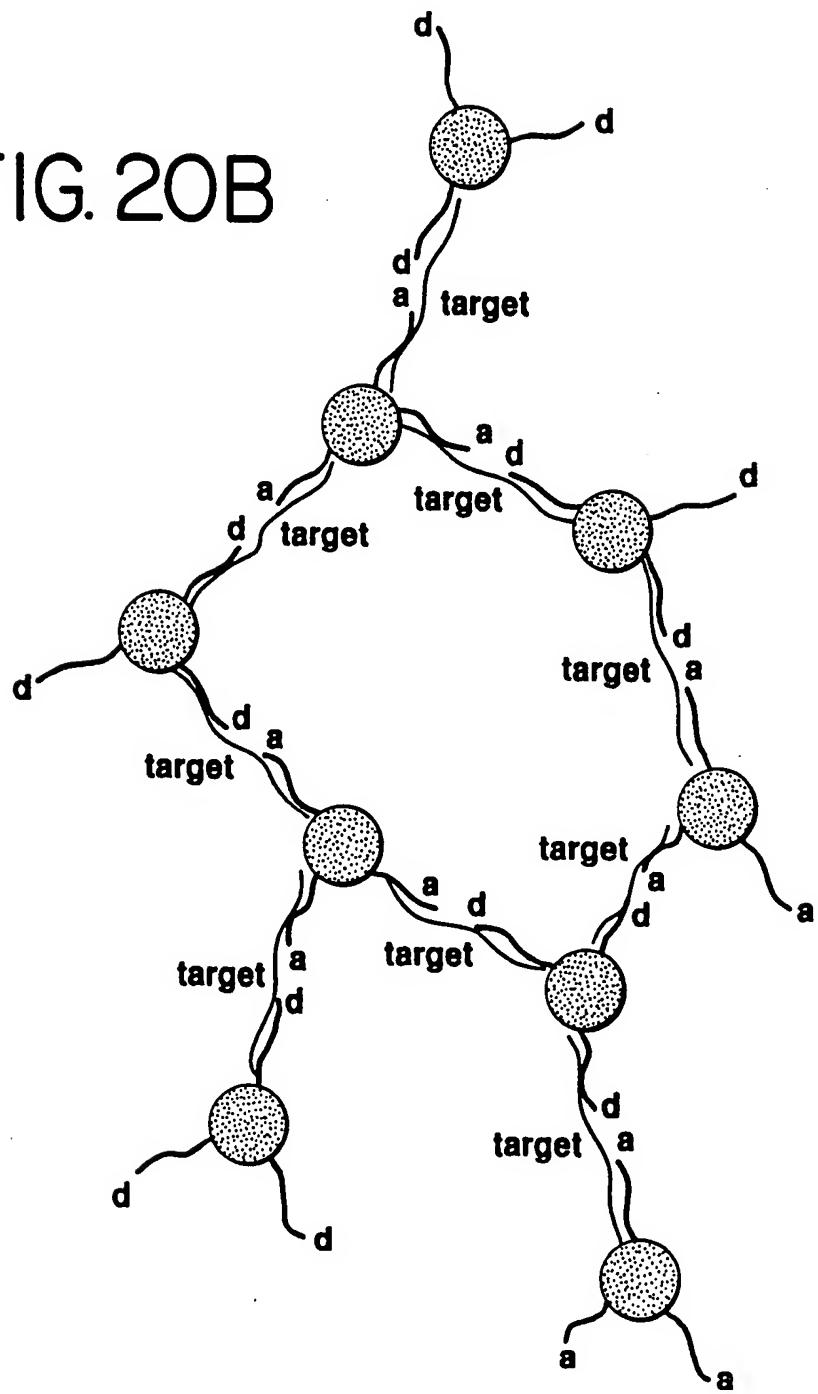


FIG. 2|

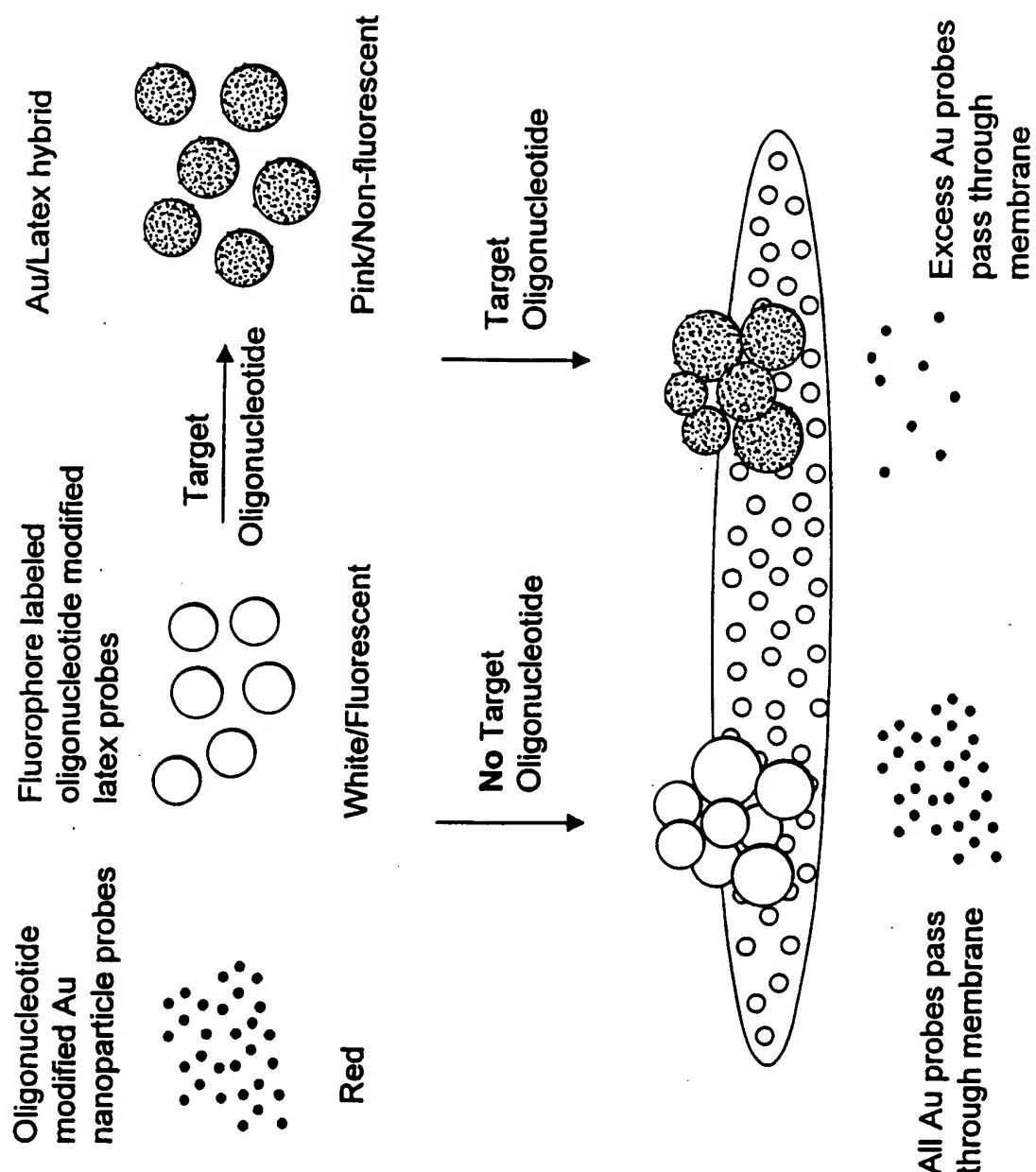
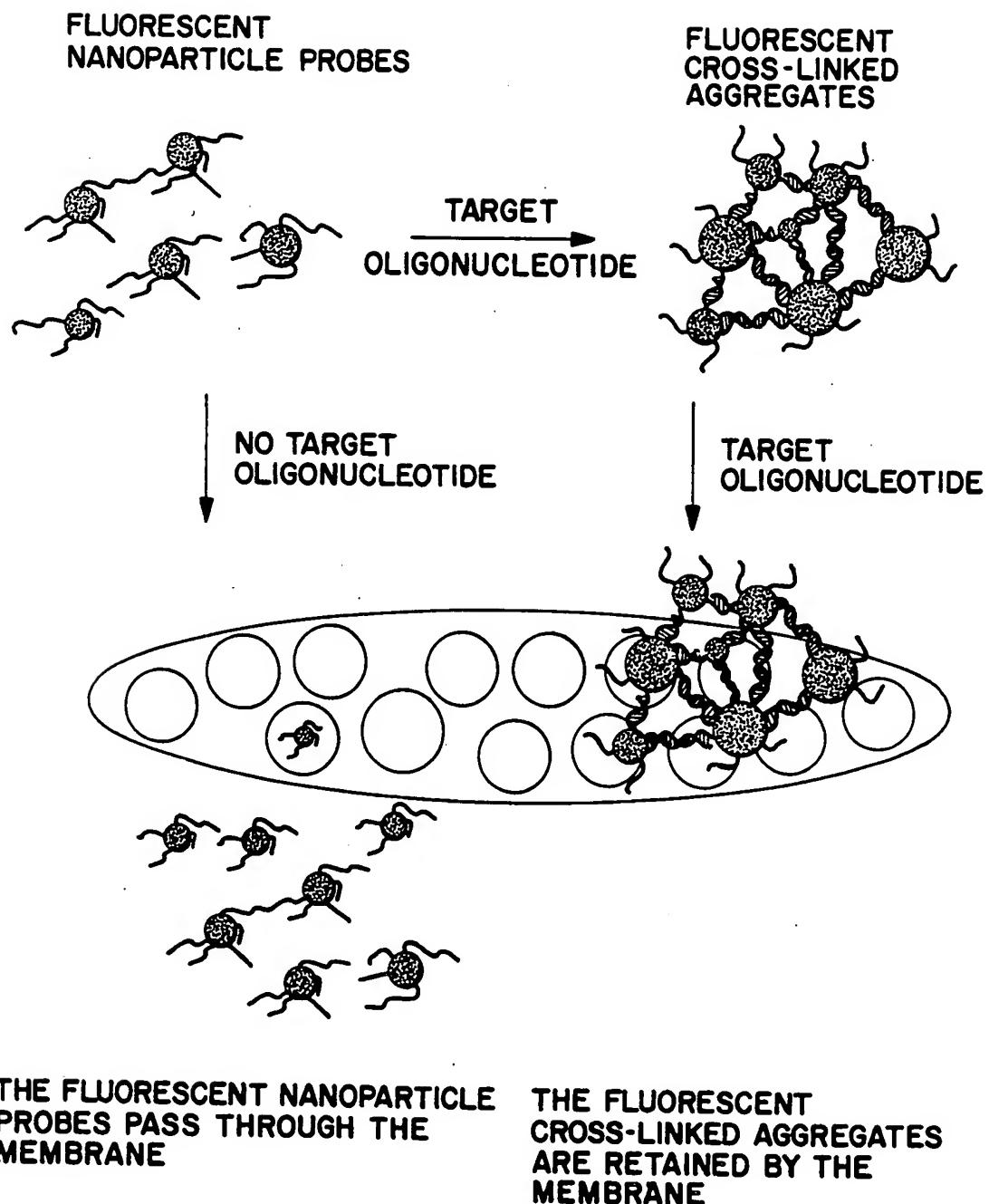


FIG. 22

FIGURE 22



# FIG. 23

## Anthrax PCR Product

5'G GCG GAT GAG TCA GTA GTT AAG GAG GCT CAT AGA GAA GTA ATT AAT  
3'C CGC CTA CTC AGT CAT CAA TTC CTC CGA GTA TCT CTT CAT TAA TTA

TCG TCA ACA GAG GGA TTA TTG TTA AAT ATT GAT AAG GAT ATA AGA AAA  
AGC AGT TGT CTC CCT AAT AAC AAT TTA TAA CTA TTC CTA TAT TCT TTT

ATA TTA TCC AGG GTT ATA TTG TAG AAA TTG AAG ATA CTG AAG GGC TT 3'  
TAT AAT AGG TCC CAA TAT AAC ATC TTT AAC TTC TAT GAC TTC CCG AA 5'

**141 mer Anthrax PCR product [SEQ ID NO:36]**

3' CTC CCT AAT AAC AAT —

[SEQ ID NO:37]

3' TTA TAA CTA TTC CTA —

[SEQ ID NO:38]

Oligonucleotide-Nanoparticle Probes

## Blocker Oligonucleotides

3' C CGC CTA CTC AGT CAT CAA TTC CTC CGA GT  
3' A TCT CTT CAT TAA TTA AGC AGT TGT  
3' TAT TCT TTT TAT AAT AGG TCC CAA TAT  
3' AAC ATC TTT AAC TTC TAT GAC TTC CCG AA

[SEQ ID NO:39]  
[SEQ ID NO:40]  
[SEQ ID NO:41]  
[SEQ ID NO:42]

FIG. 24

PROGRESS REPORT

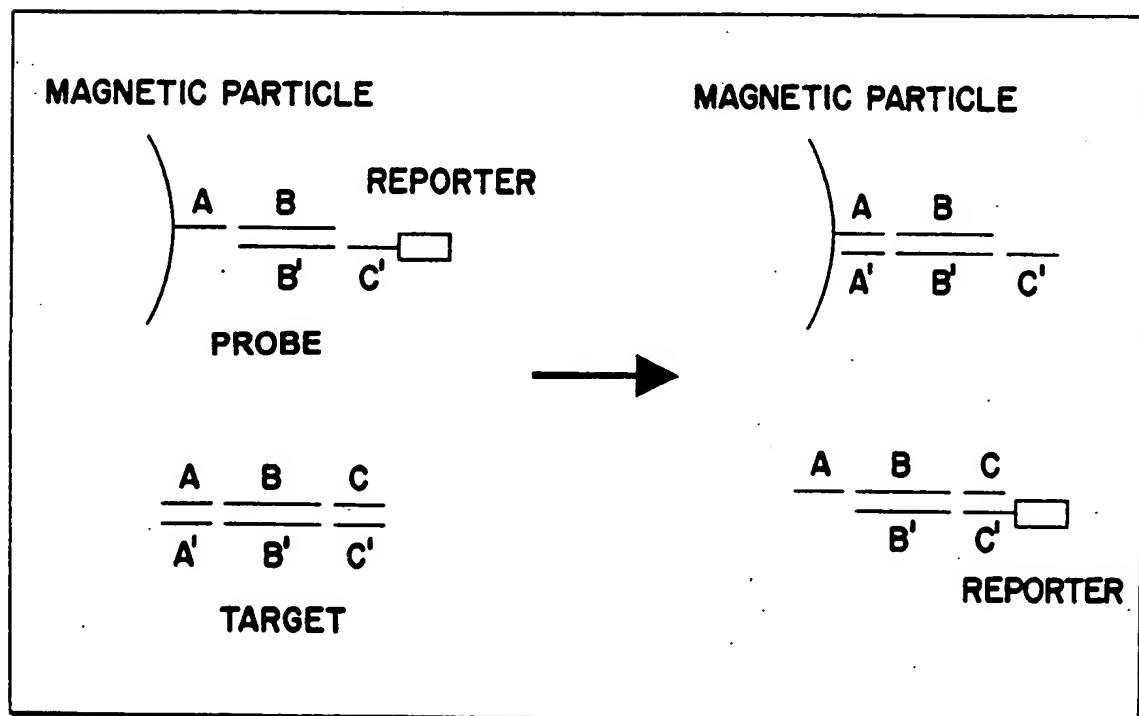
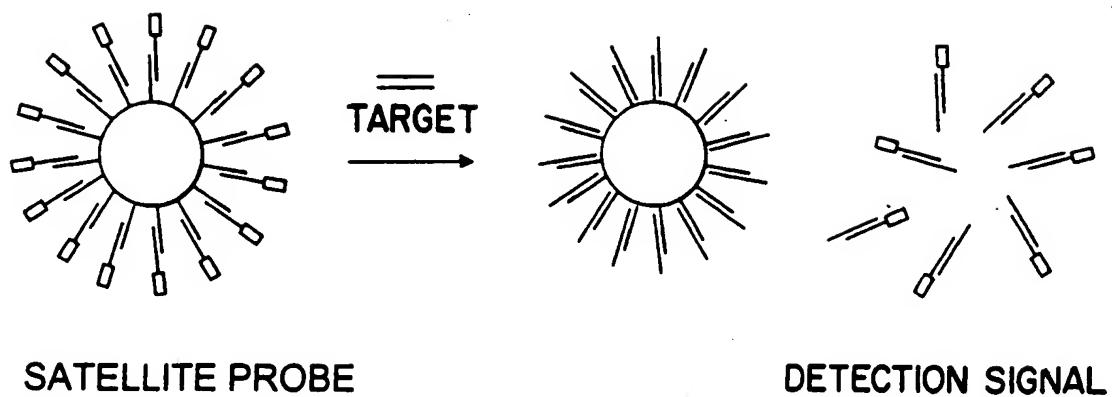


FIG. 25A

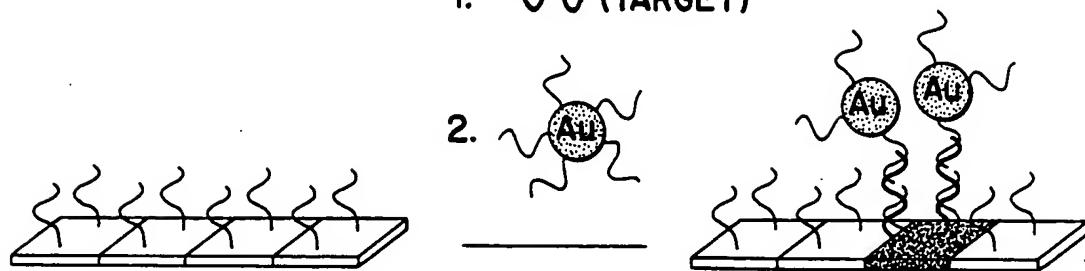
1.  $\sim$  (TARGET)

FIG. 25B

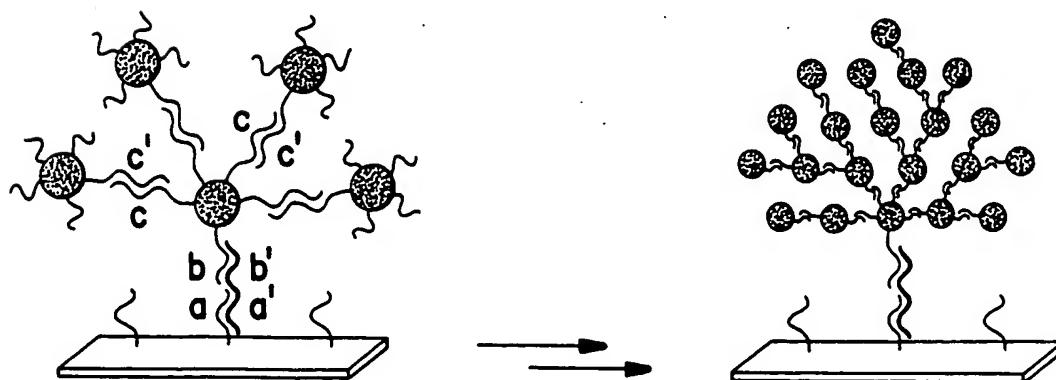
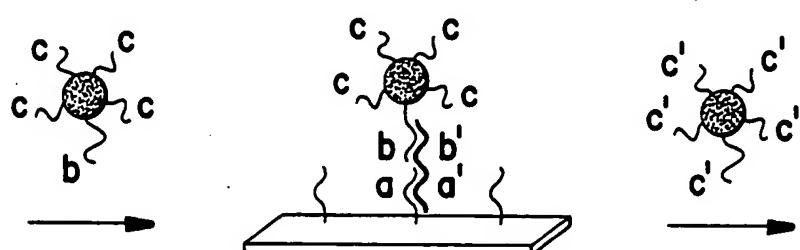
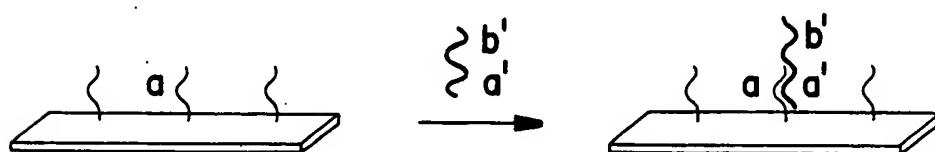
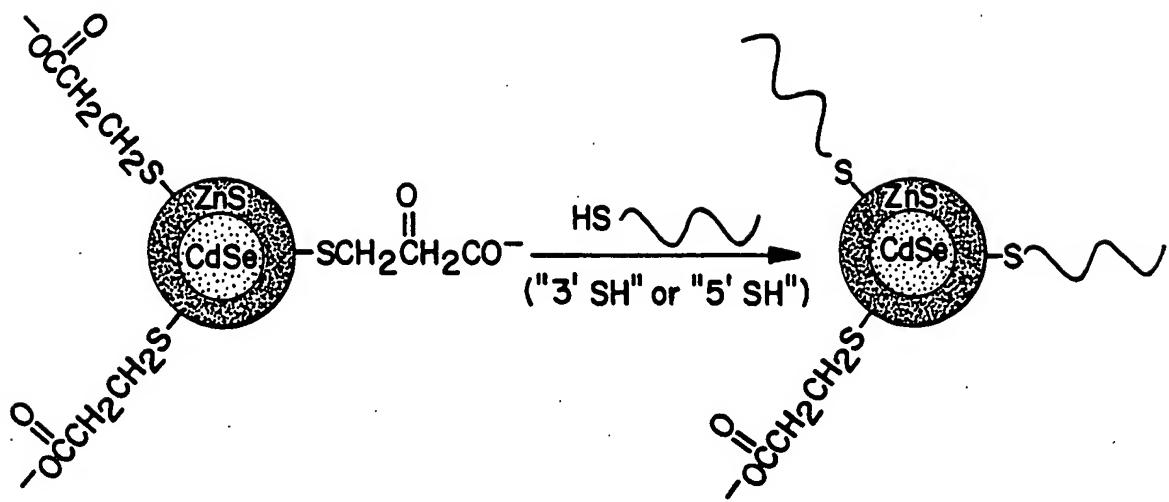


FIG. 26A



T020021-02/04

FIG. 26B

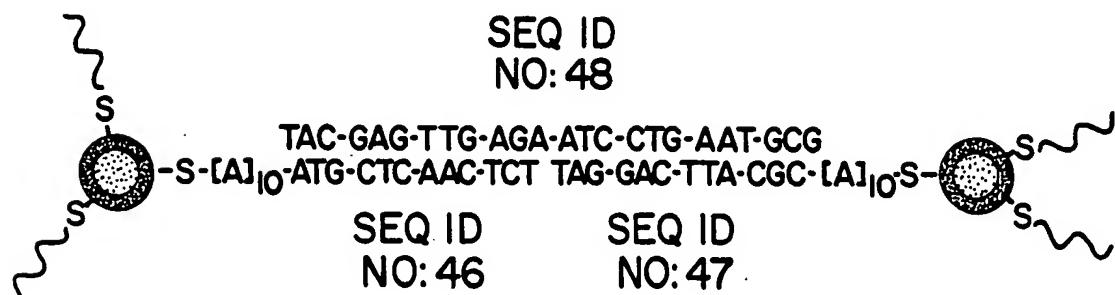


FIG. 27A

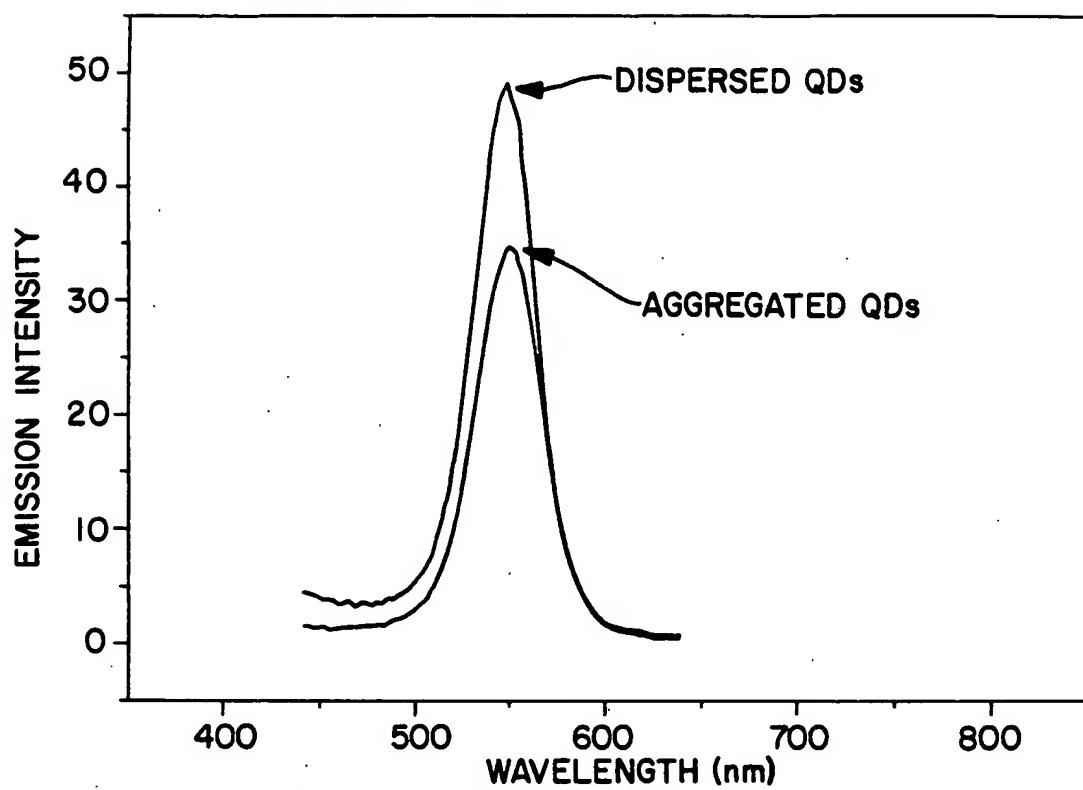


FIG. 27B

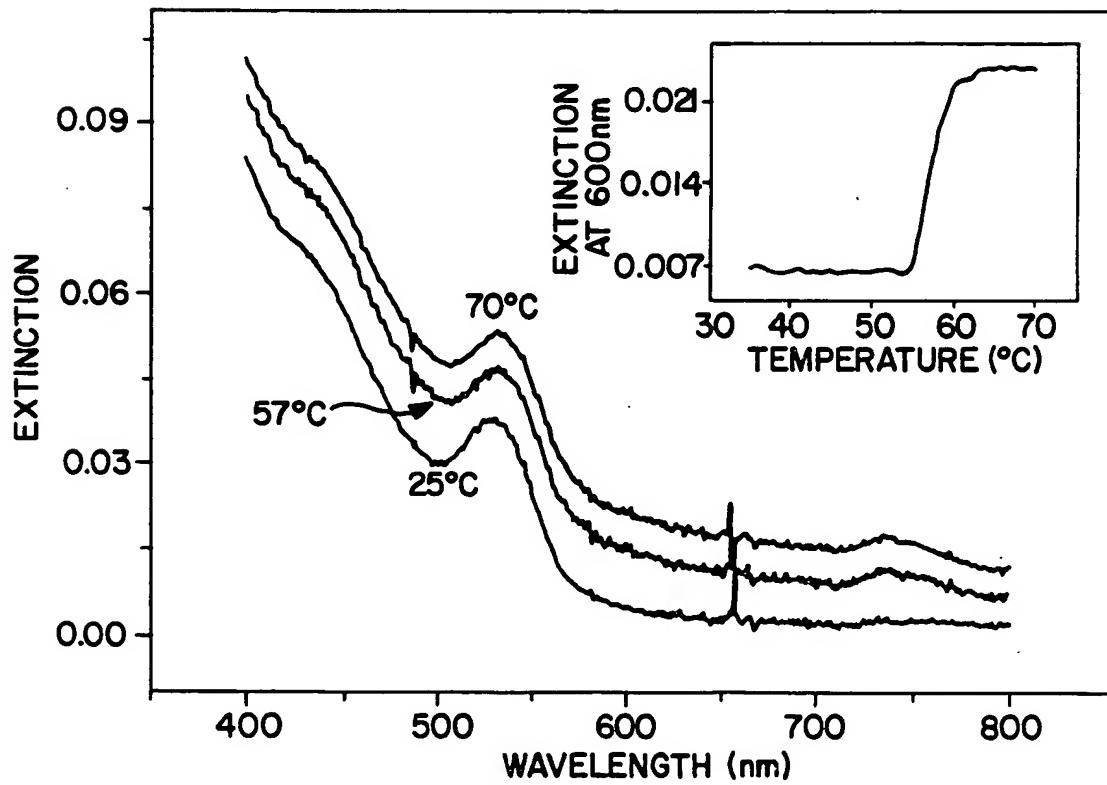
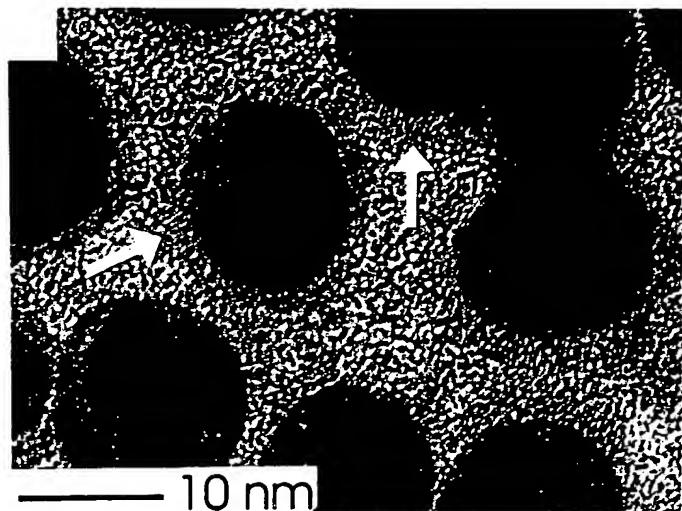


FIG. 27C



TRANSMISSION ELECTRON MICROGRAPH

FIG. 27D

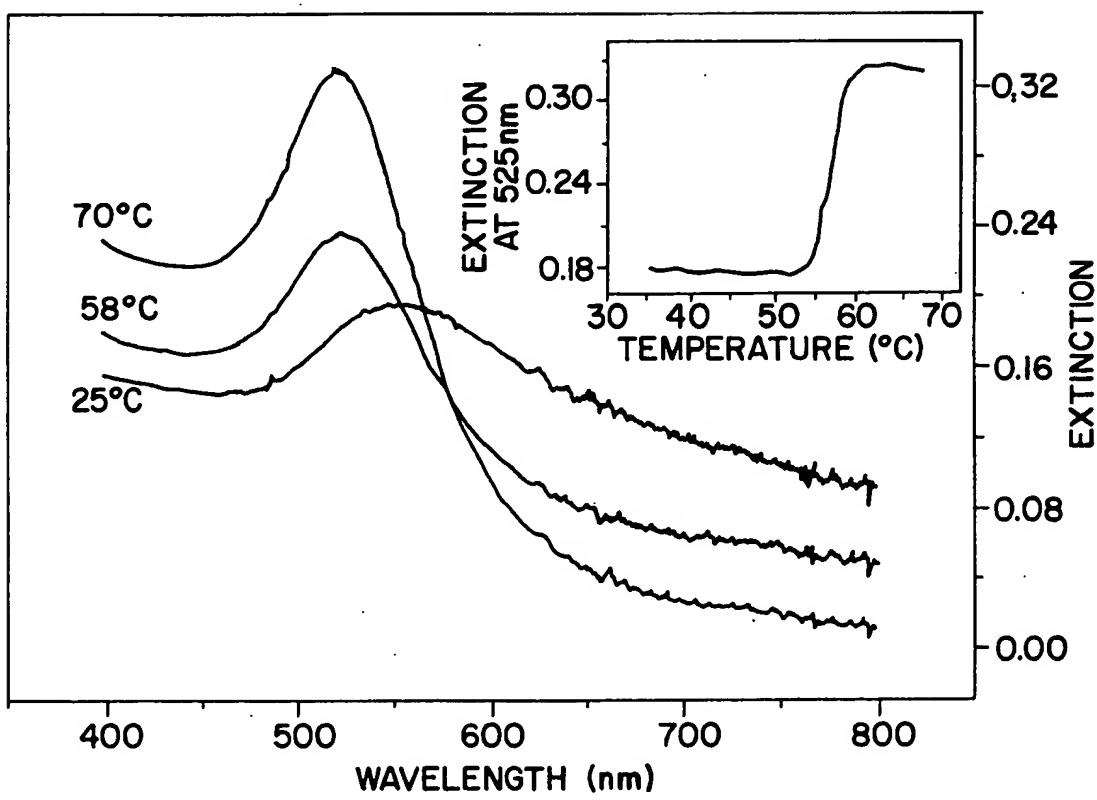


FIG. 28A

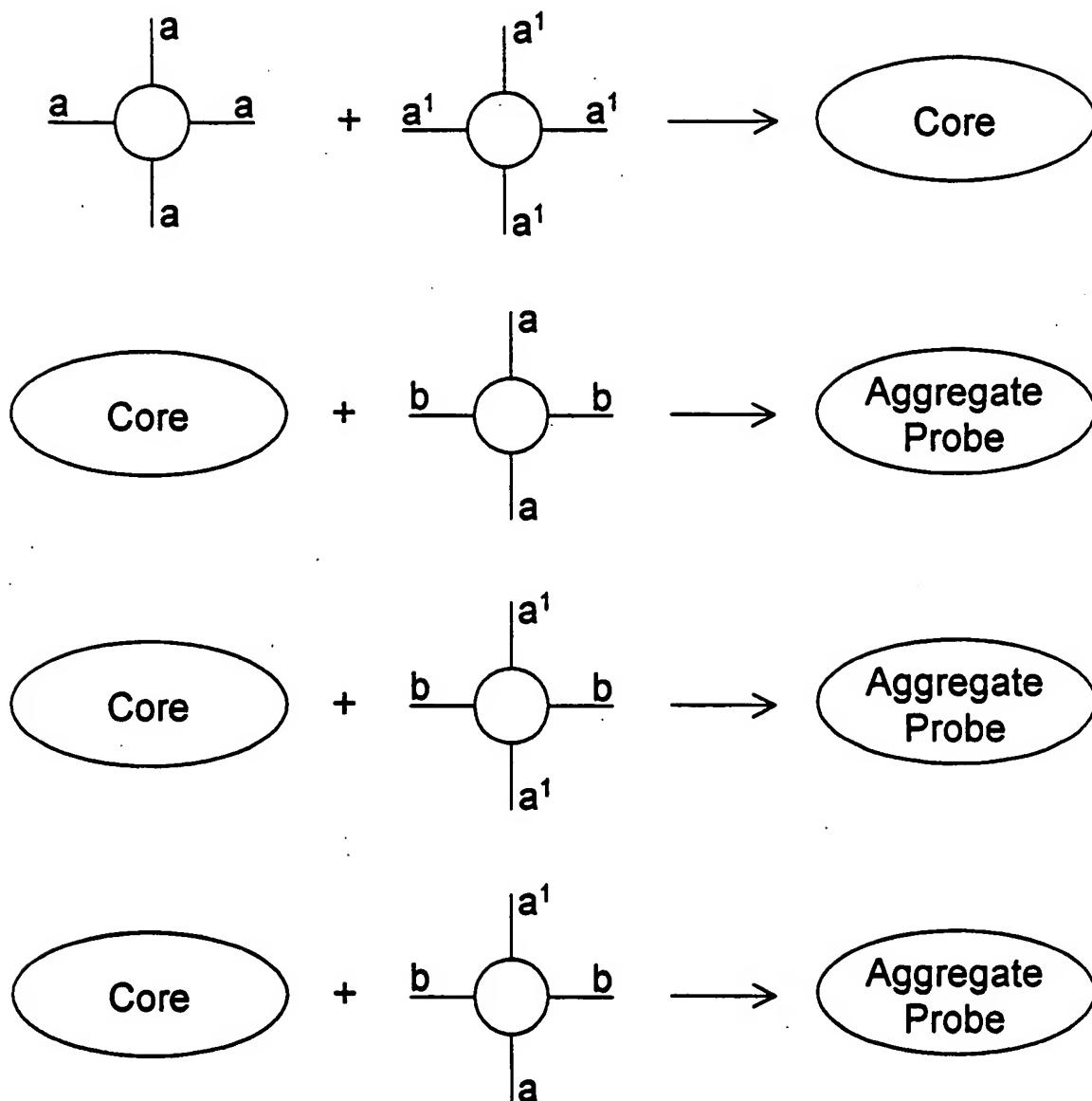
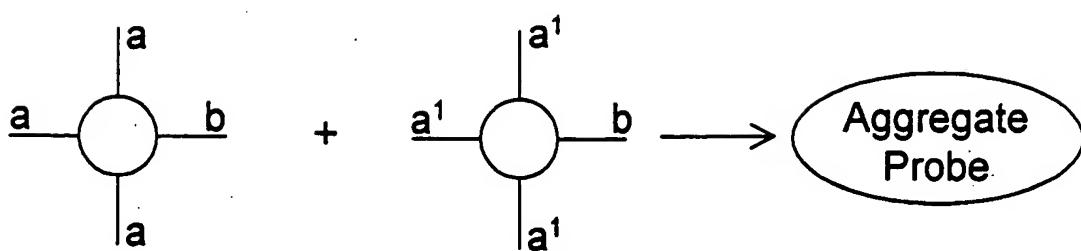


FIG. 28B



TOP SECRET - EXCEPT EXCERPT

FIG. 28C

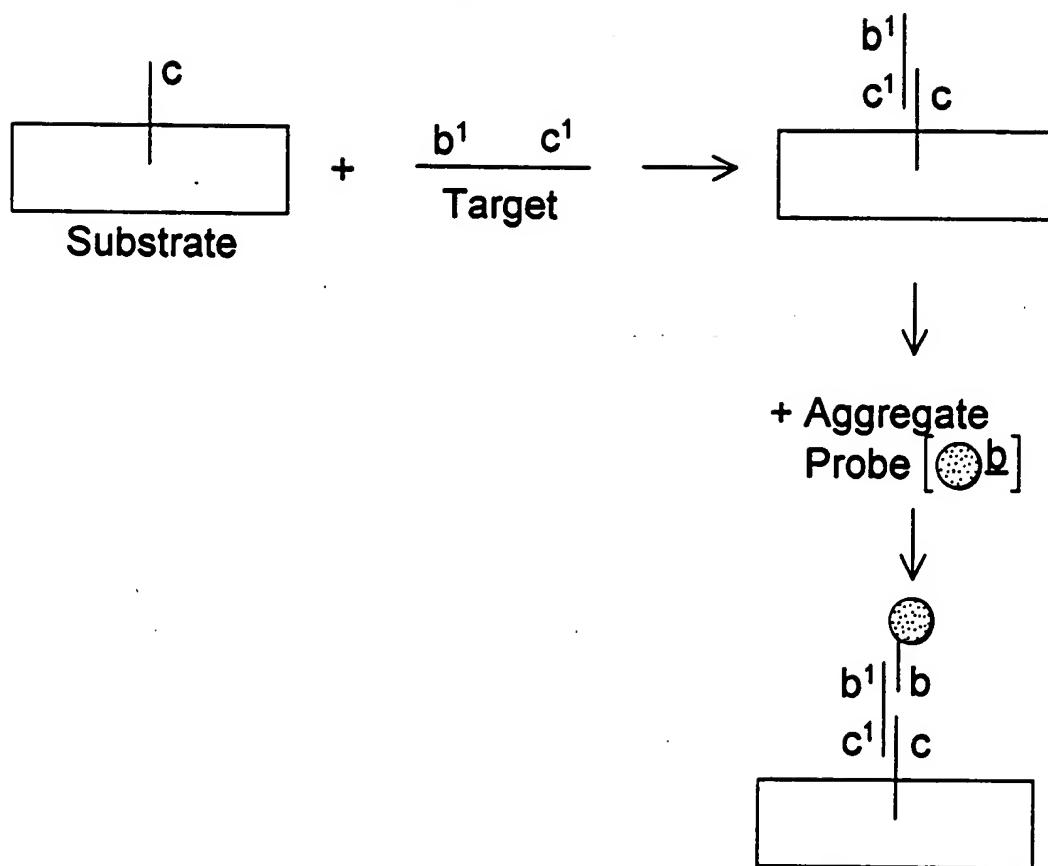


FIG. 28D

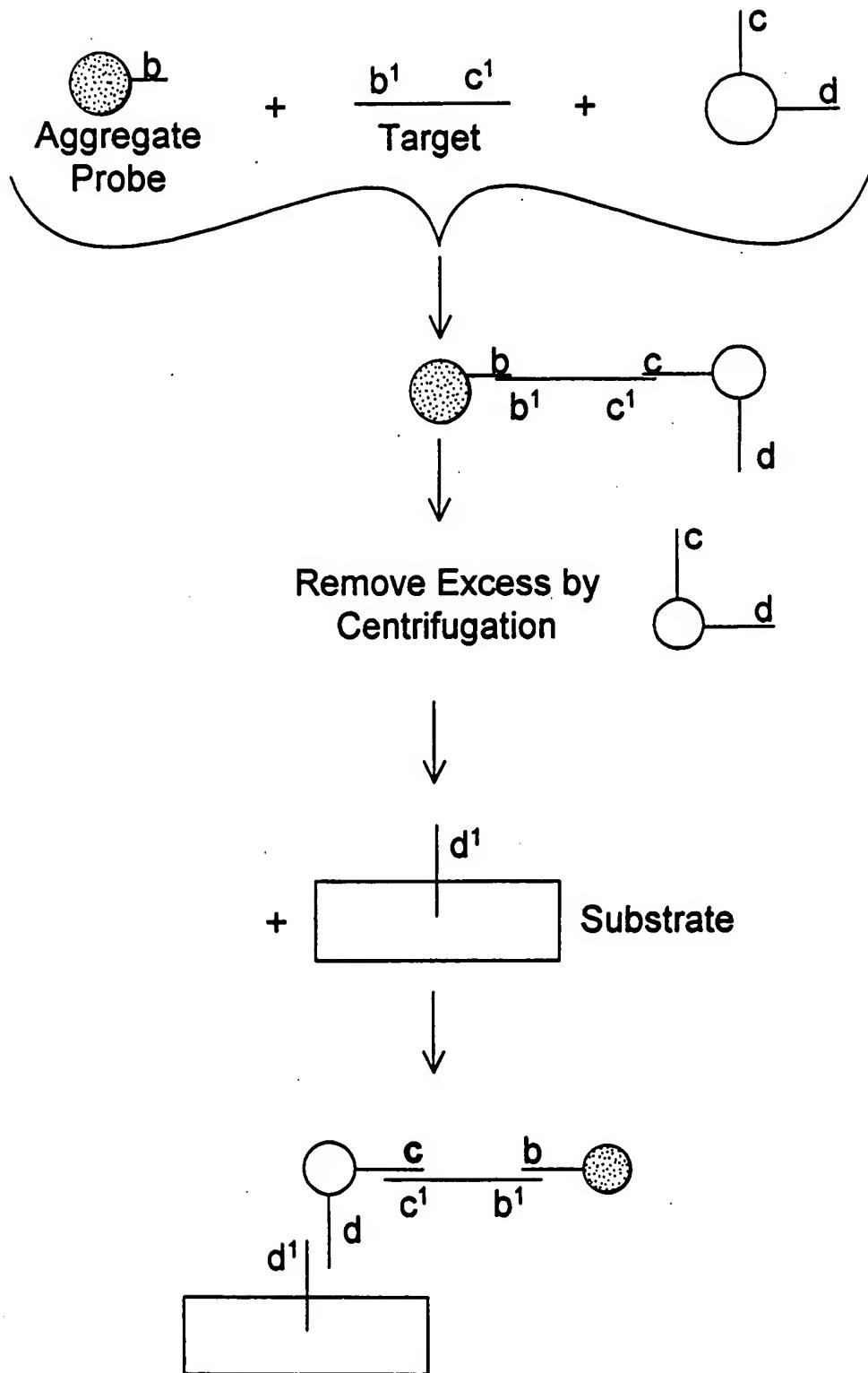


FIG. 28E

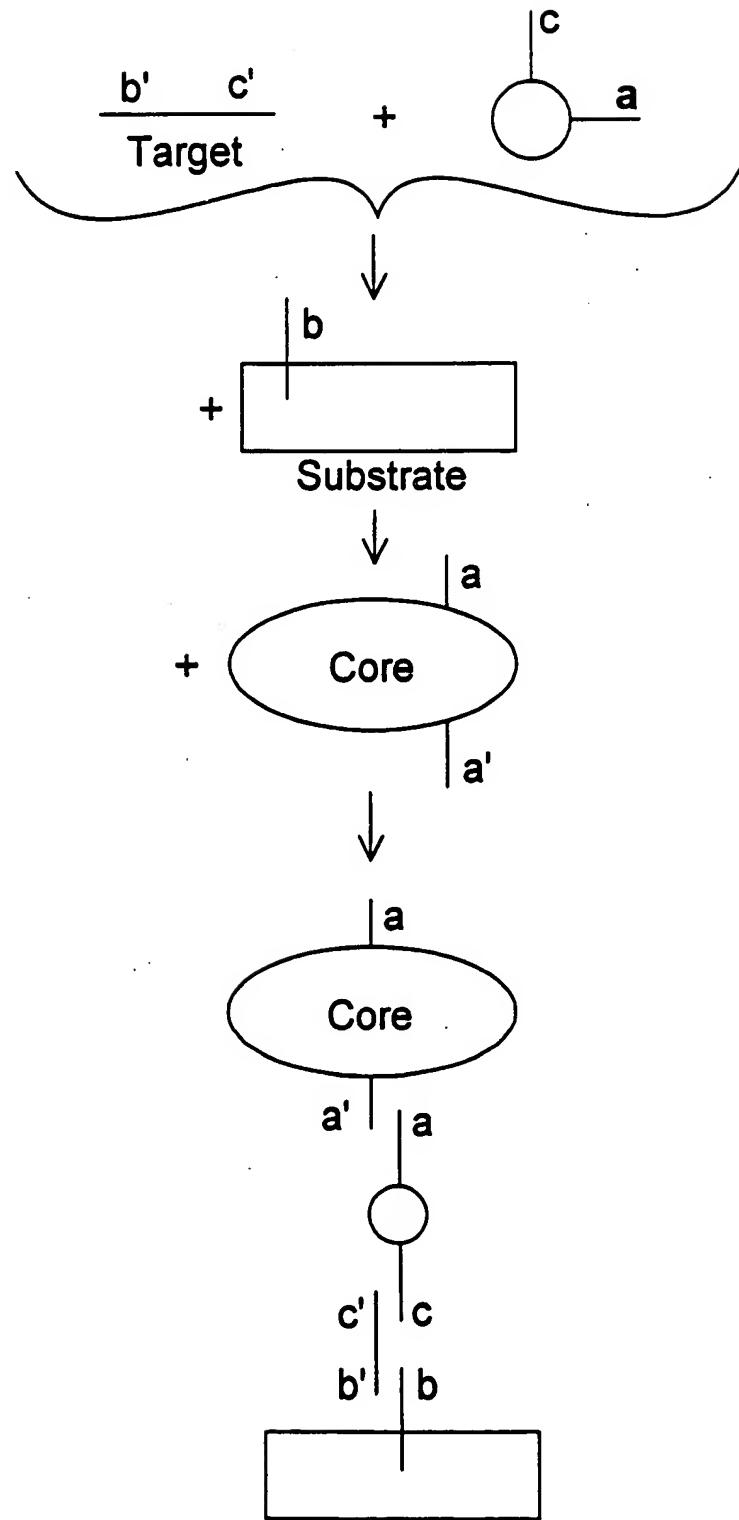


FIG. 29

Fractional Displacement by ME

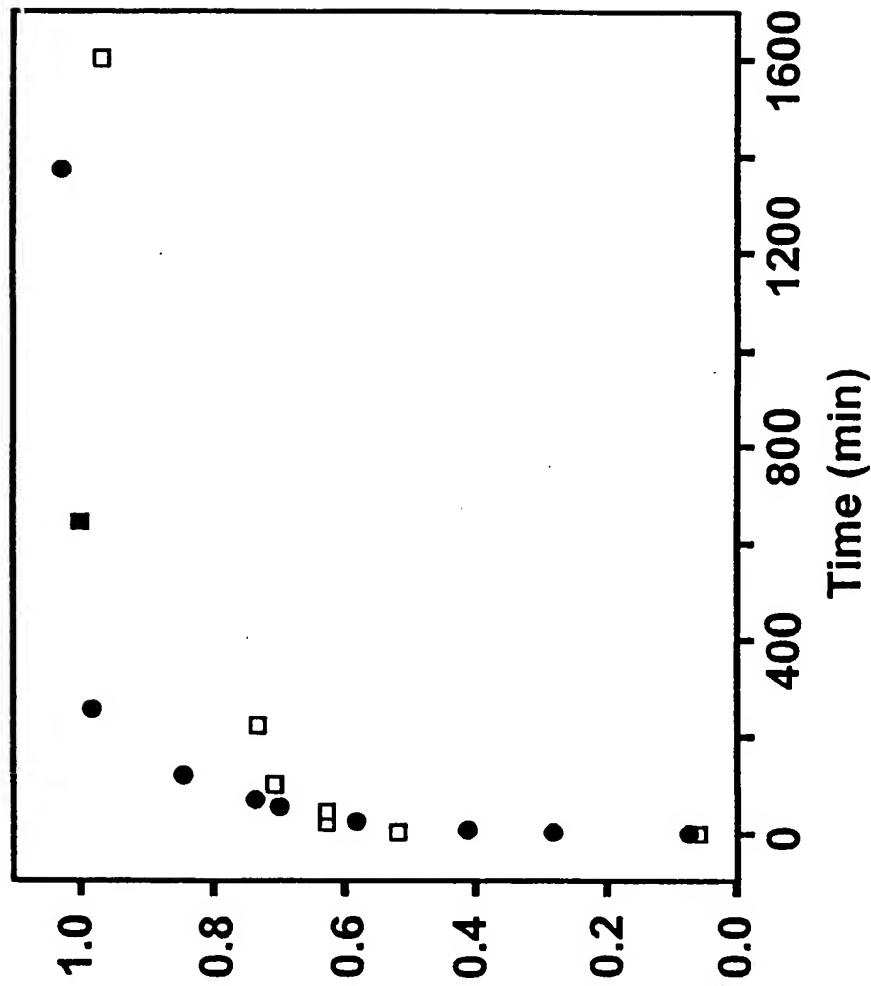


FIG. 30

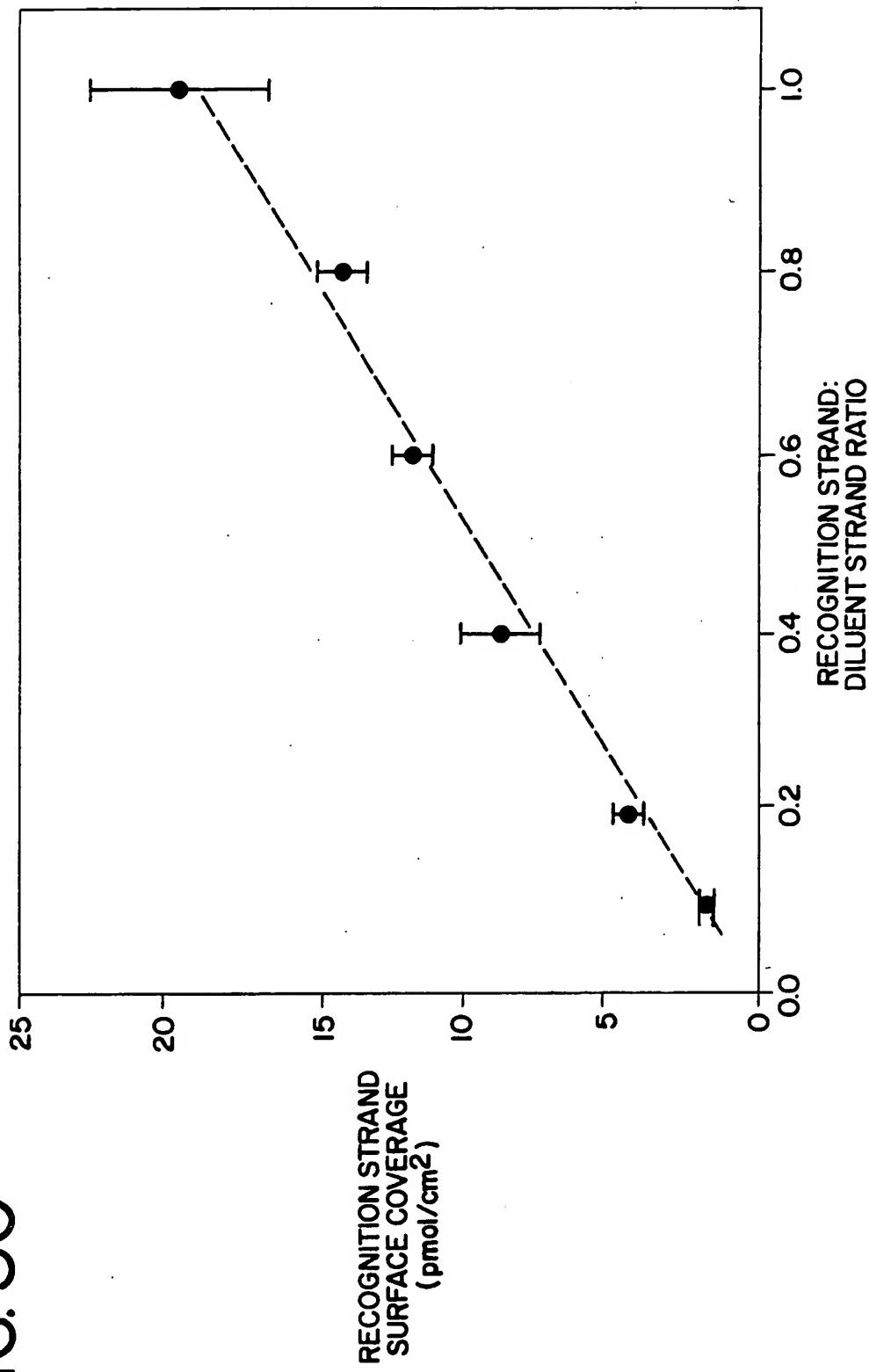
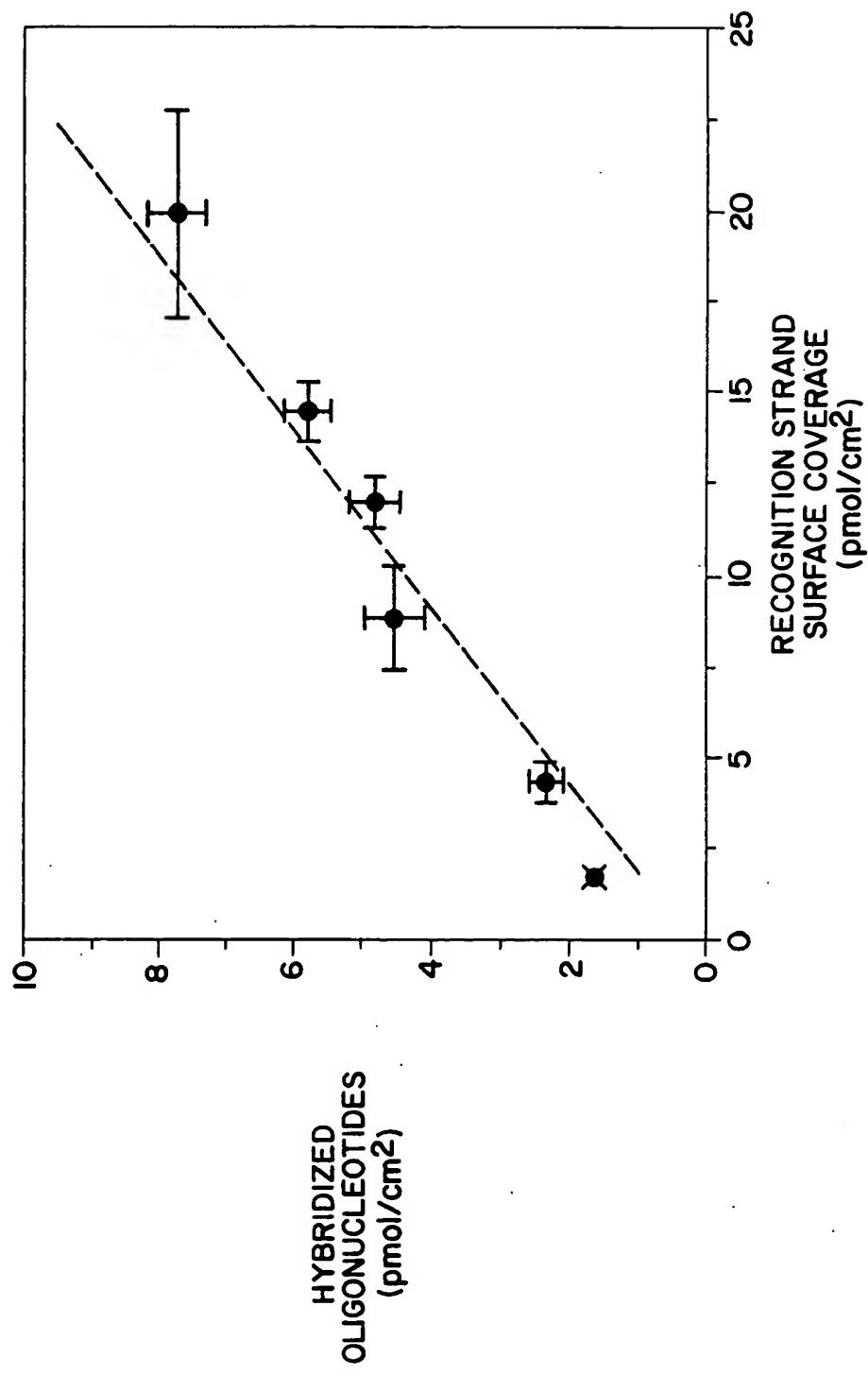
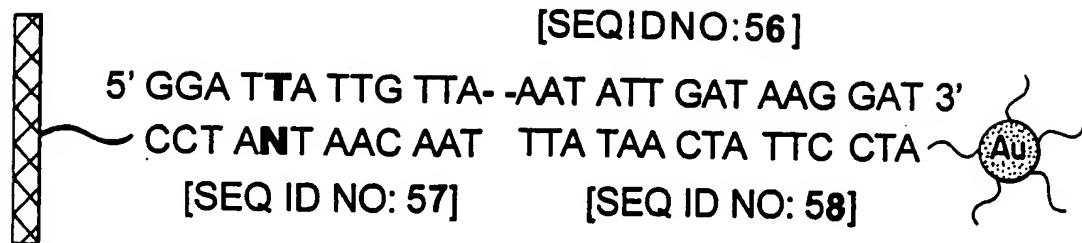


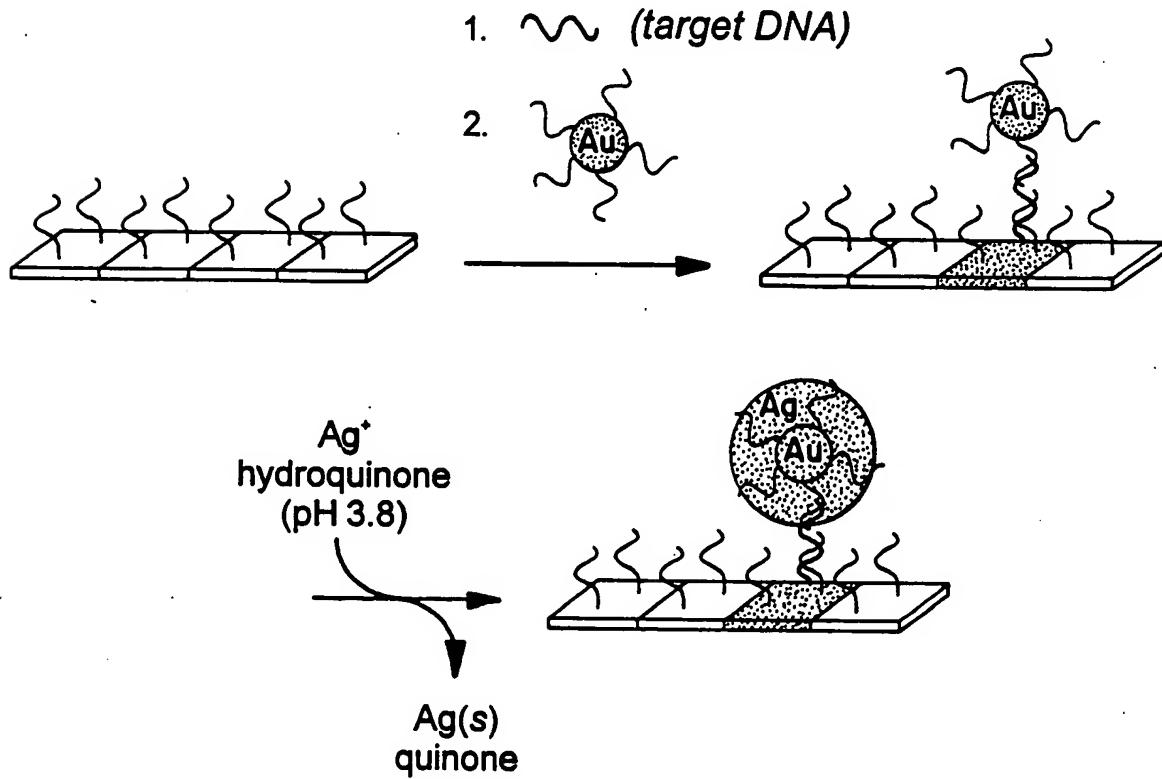
FIG. 3I



## FIG. 32



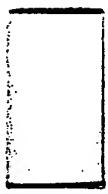
**N** = A (complementary),  
 G,C,T (mismatched)



# FIG.33



**A**



**B**



**C**



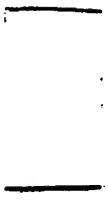
**D**



**E**



**F**



**G**

FIG. 34

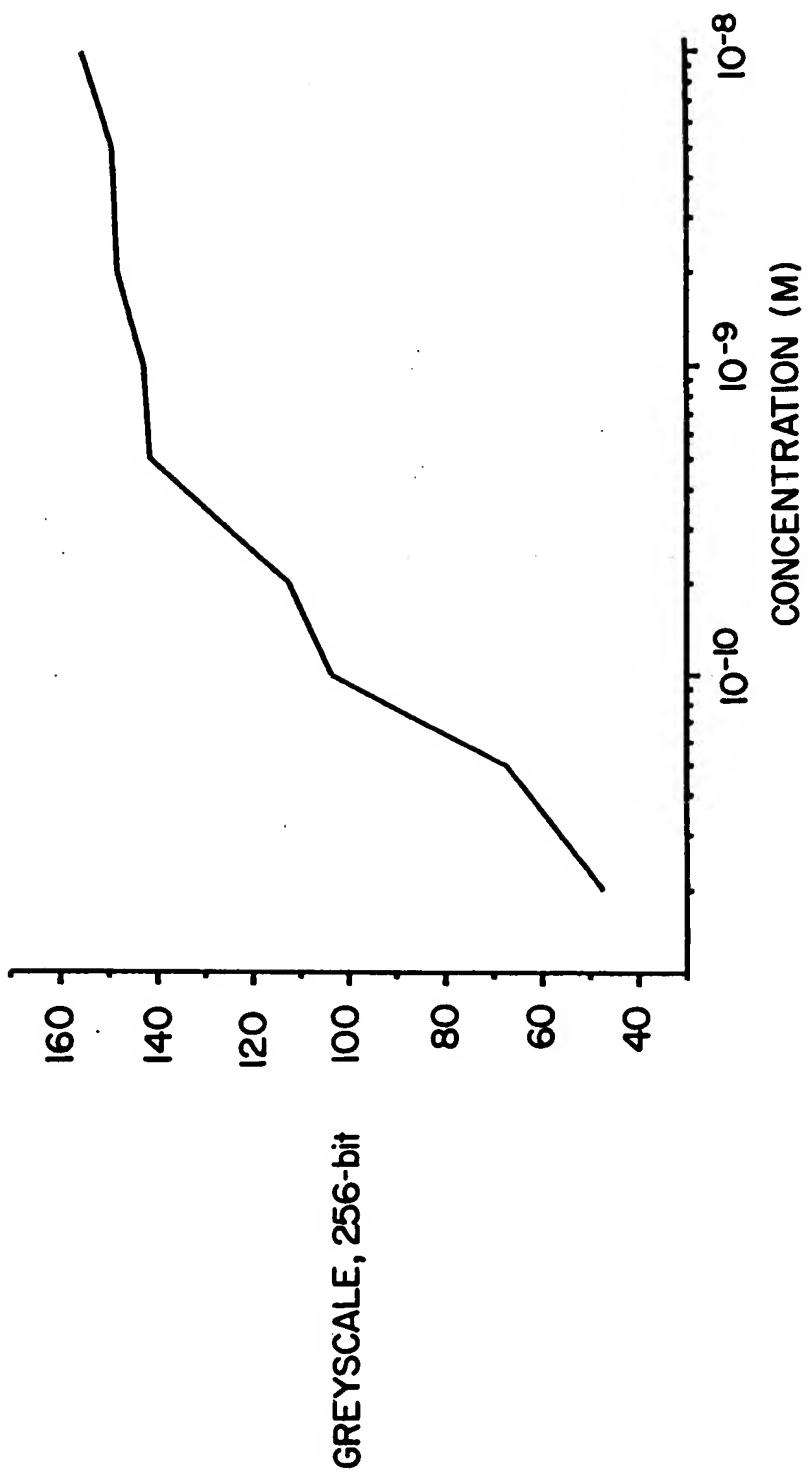


FIG.35A

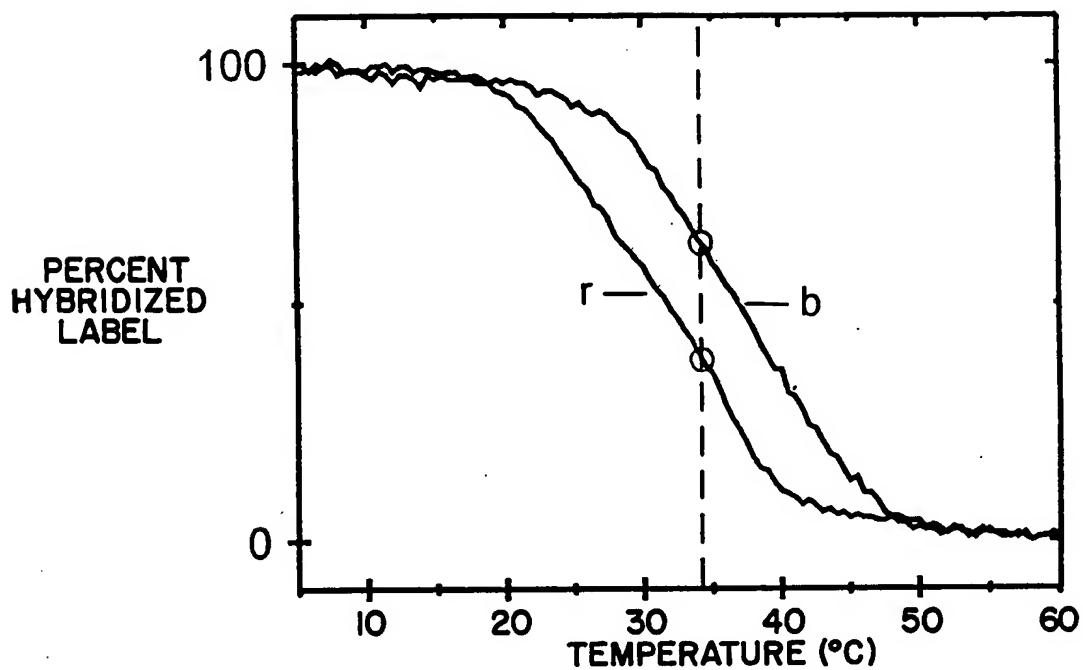


FIG.35B

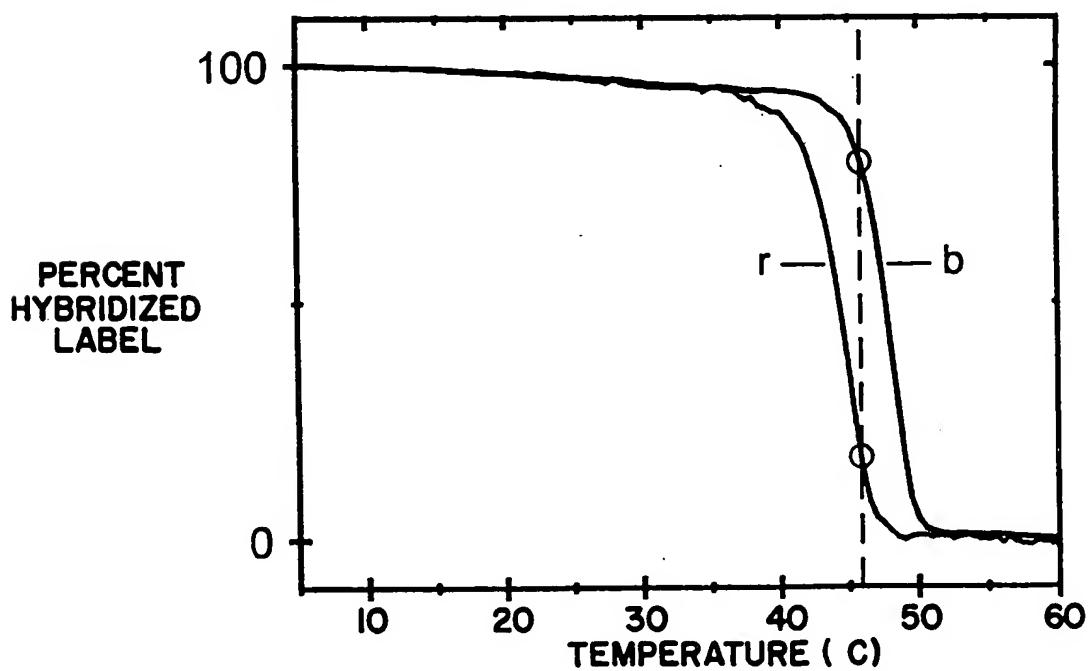


FIG. 36A

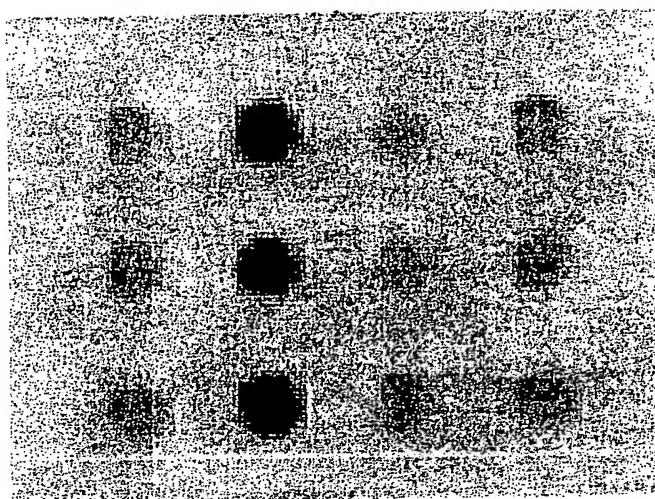
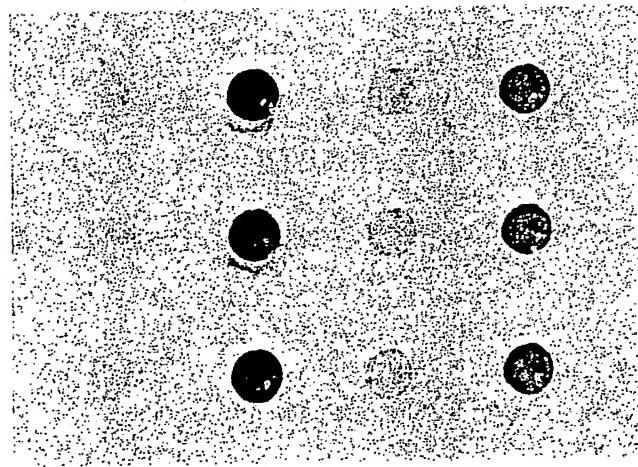


FIG. 36B



C A T G

FIG.37A

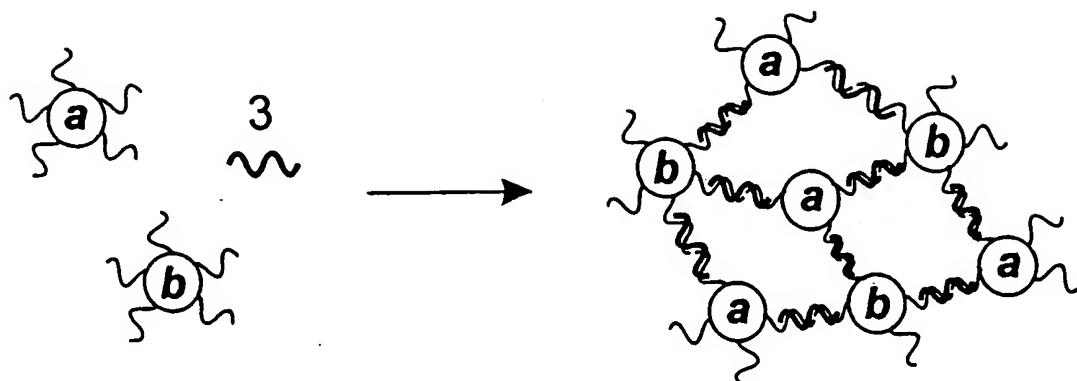


FIG.37B

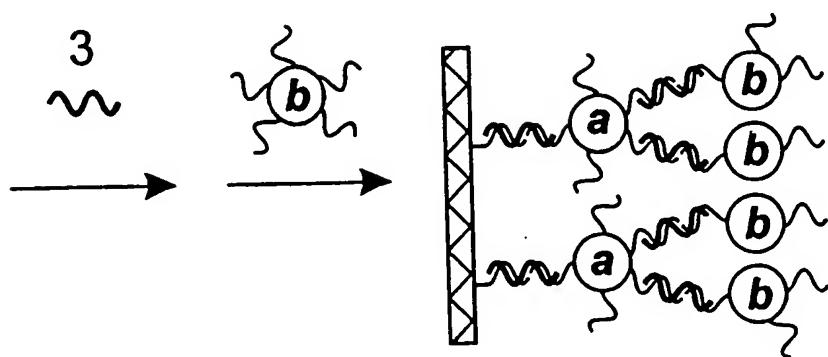
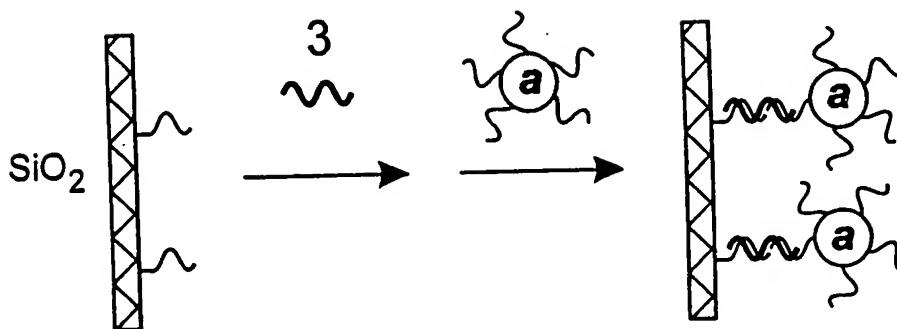


FIG. 38A

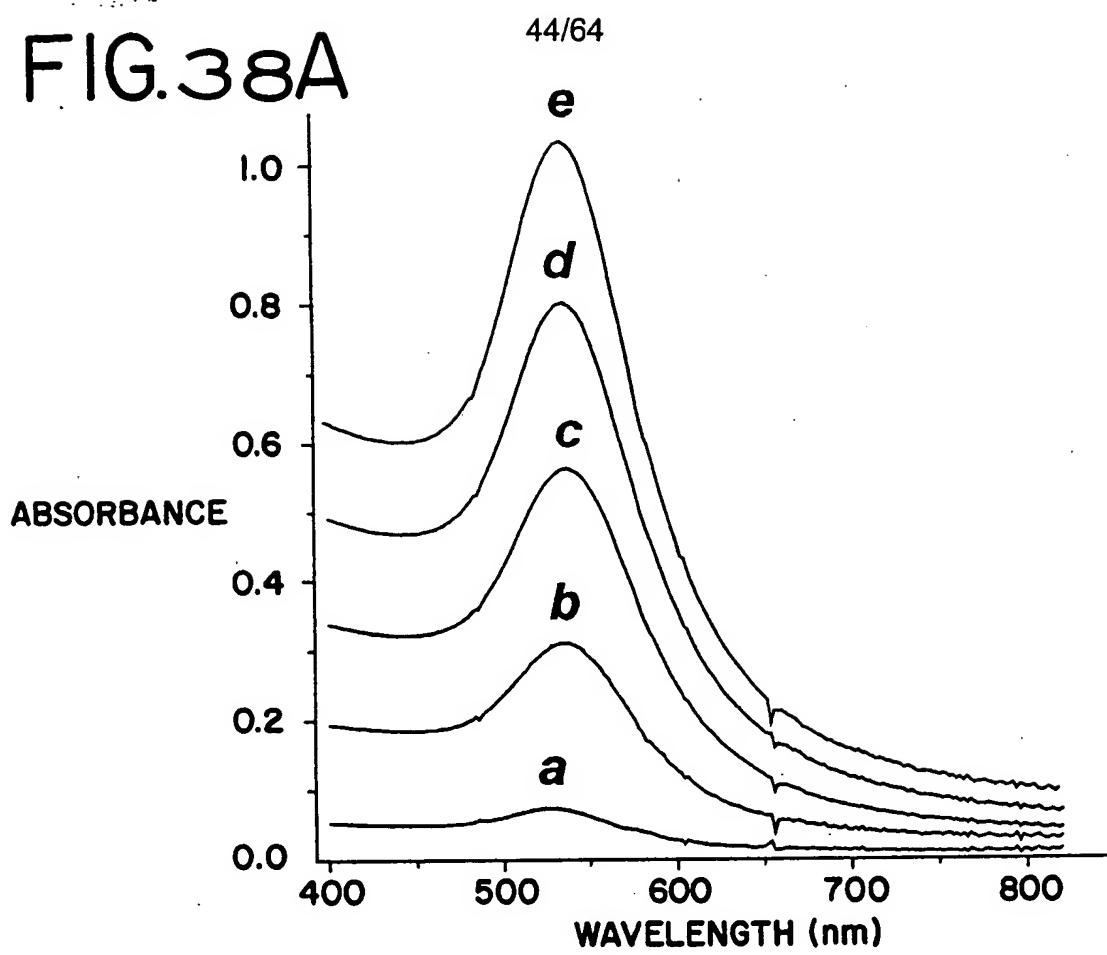


FIG. 38B

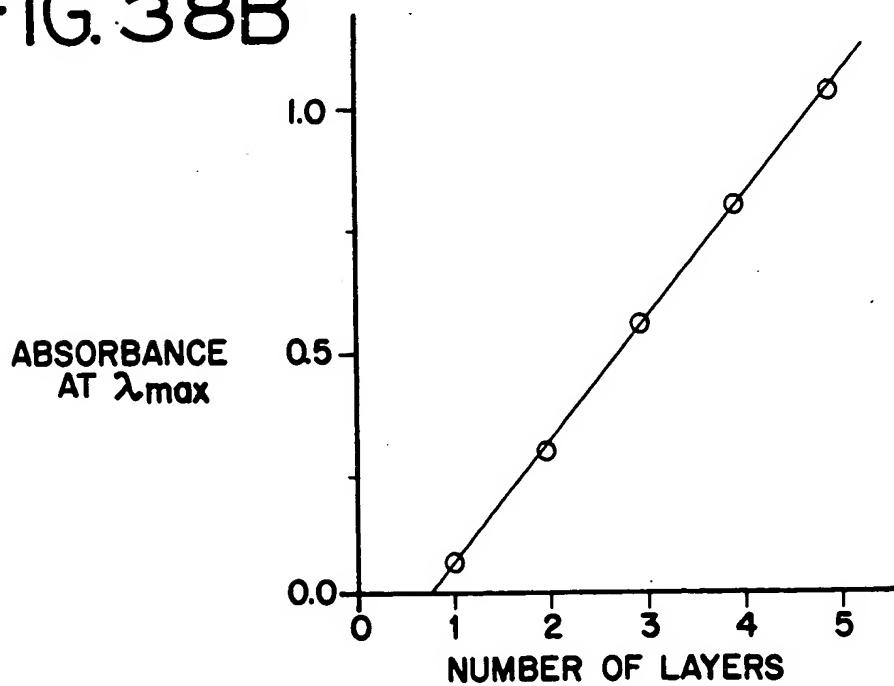


FIG.39A

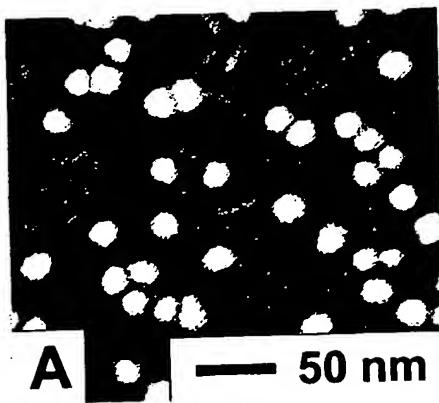


FIG.39B

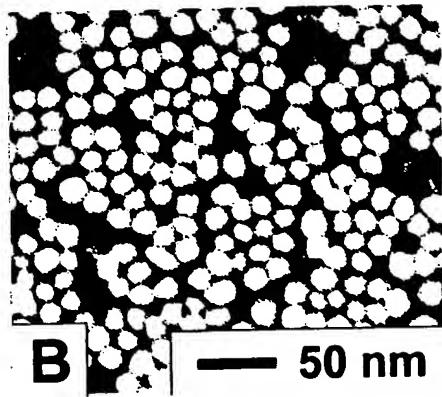


FIG.39C

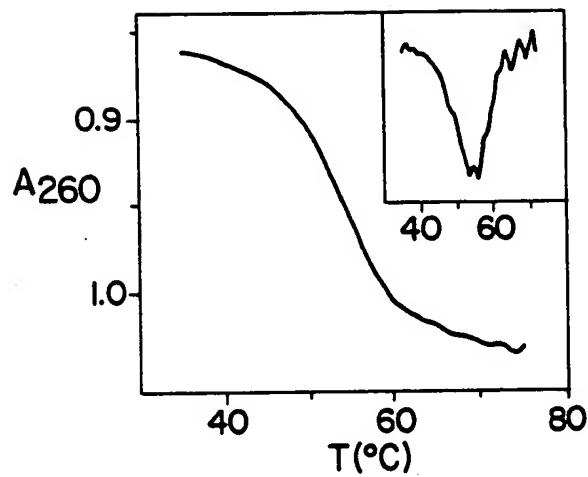


FIG.39D

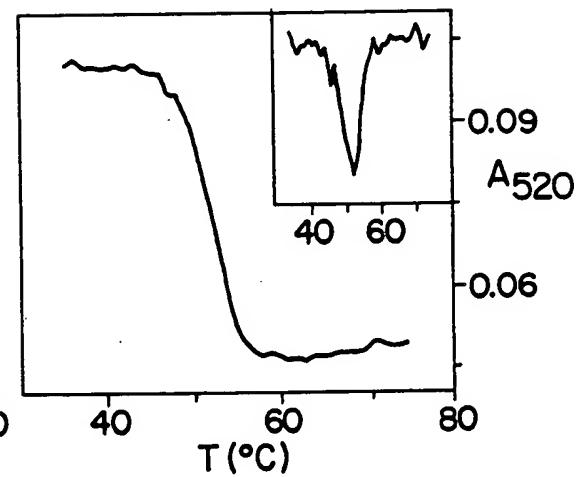


FIG.39E

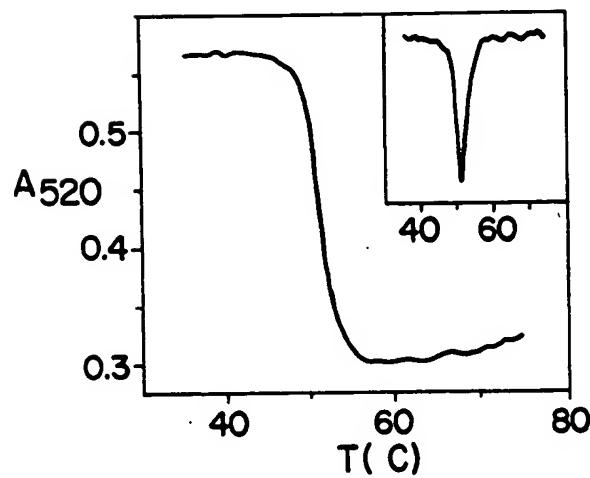


FIG.39F

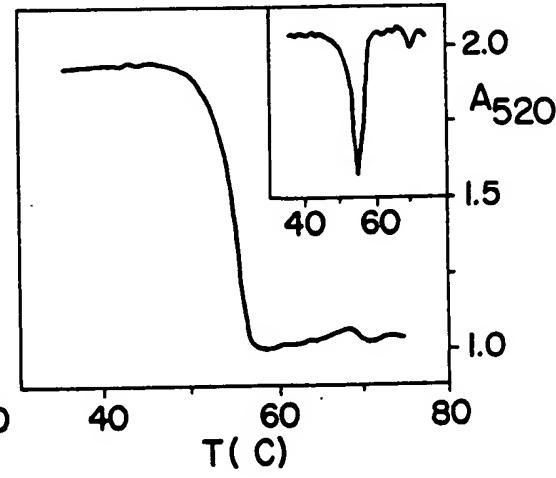
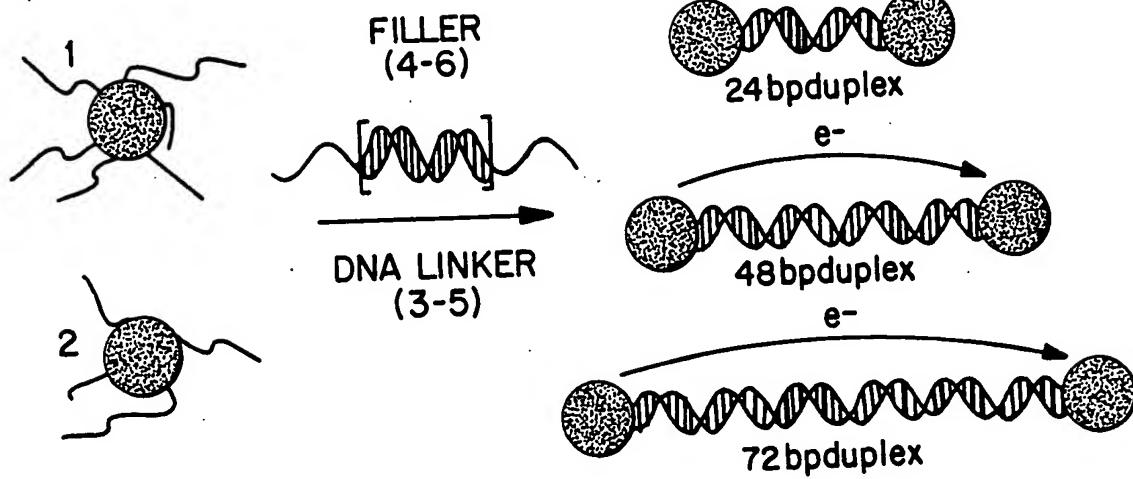
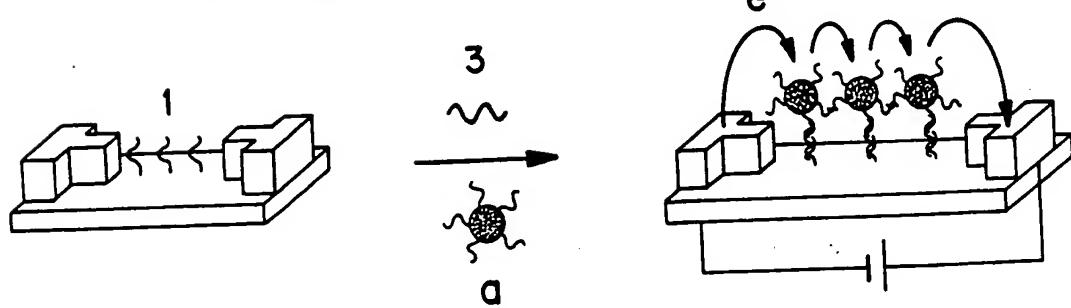


FIG. 40

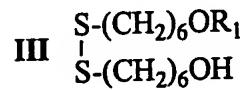
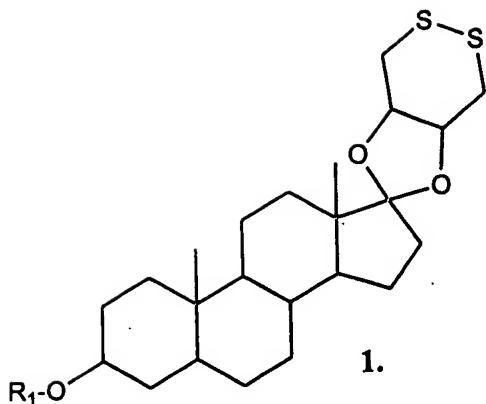


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FIG. 41



## FIG. 42



$\text{R}_1$

a = H

b =  $(\text{iPr})_2\text{NP(OCH}_2\text{CH}_2\text{CN)}$ -

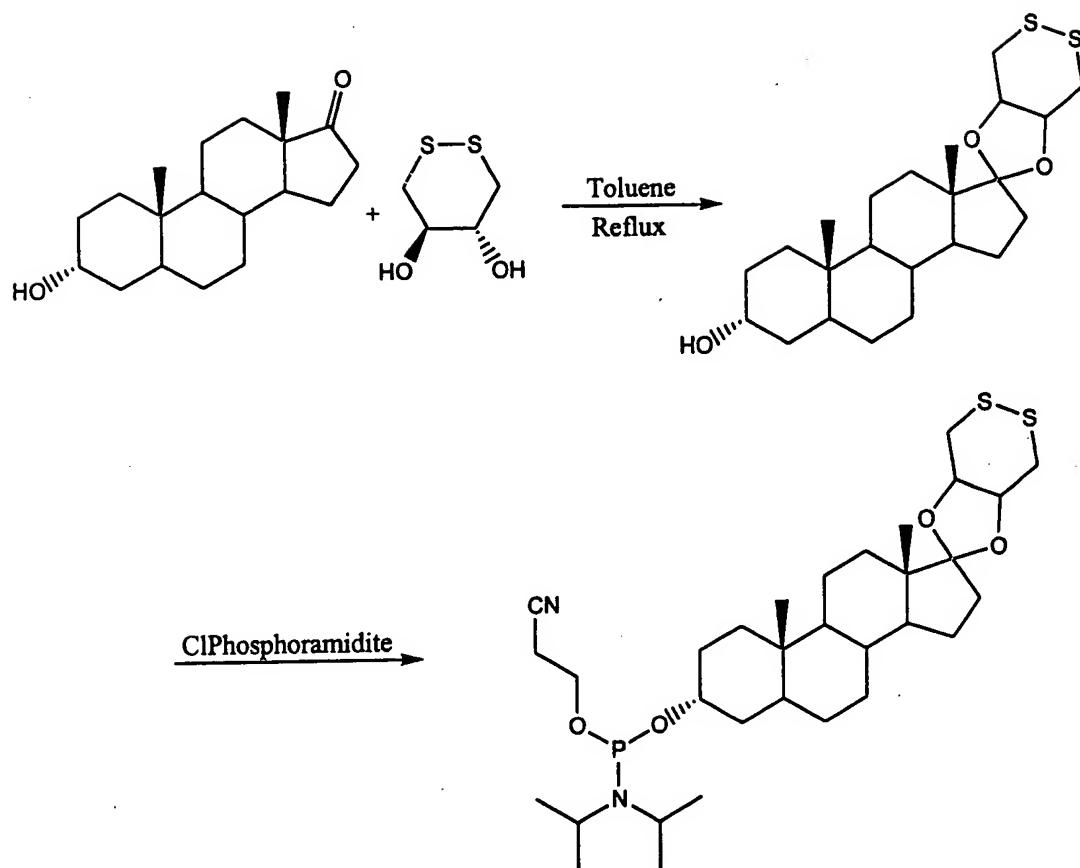
c1 = 5'-p(A<sub>20</sub>)-TATCGTCCATCAGCT [SEQ ID NO: 65]

c2 = 5'-p(A<sub>20</sub>)-TTGATCTTCCGTTCT [SEQ ID NO: 66]

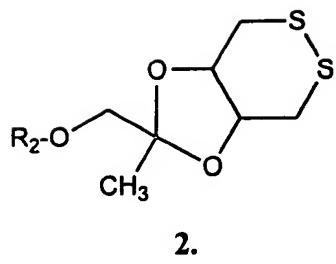
Target I = 79-mer oligonucleotide with target region:

3'-.....ATAGCAAGGTAGTCGAGCAACTAGAAAGGCAAGA.....5'  
[SEQ ID NO: 67]

FIG. 43

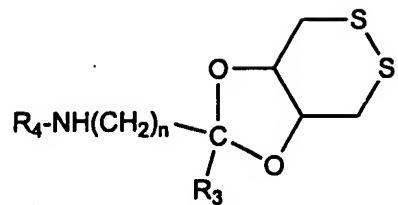
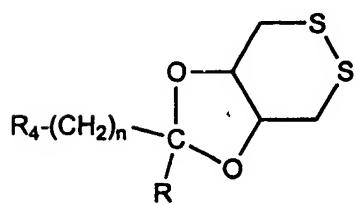


## FIG. 44

 $R_2$  $a = H$  $b = (iPr)_2NP(OCH_2CH_2CN)-$  $c1 = 5'-p(A_{20})-GCAGACCTCA$  [SEQ ID NO: 68] $c2 = 5'-p(A_{20})-CCTATGTGTCG$  [SEQ ID NO: 69] $D = 5'-p(A_{20})$  [SEQ ID NO: 70]

Target I = 63-mer oligonucleotide with target region:

3'.....CGTCTGGAGTGGATACACAGC.....5'  
 [SEQ ID NO: 71]

 $R_3$  = hydrogen, an alkyl group, an aryl group, or a substituted alkyl or aryl group $R_4$  = an attached oligonucleotide or modified oligonucleotide

## FIG. 45

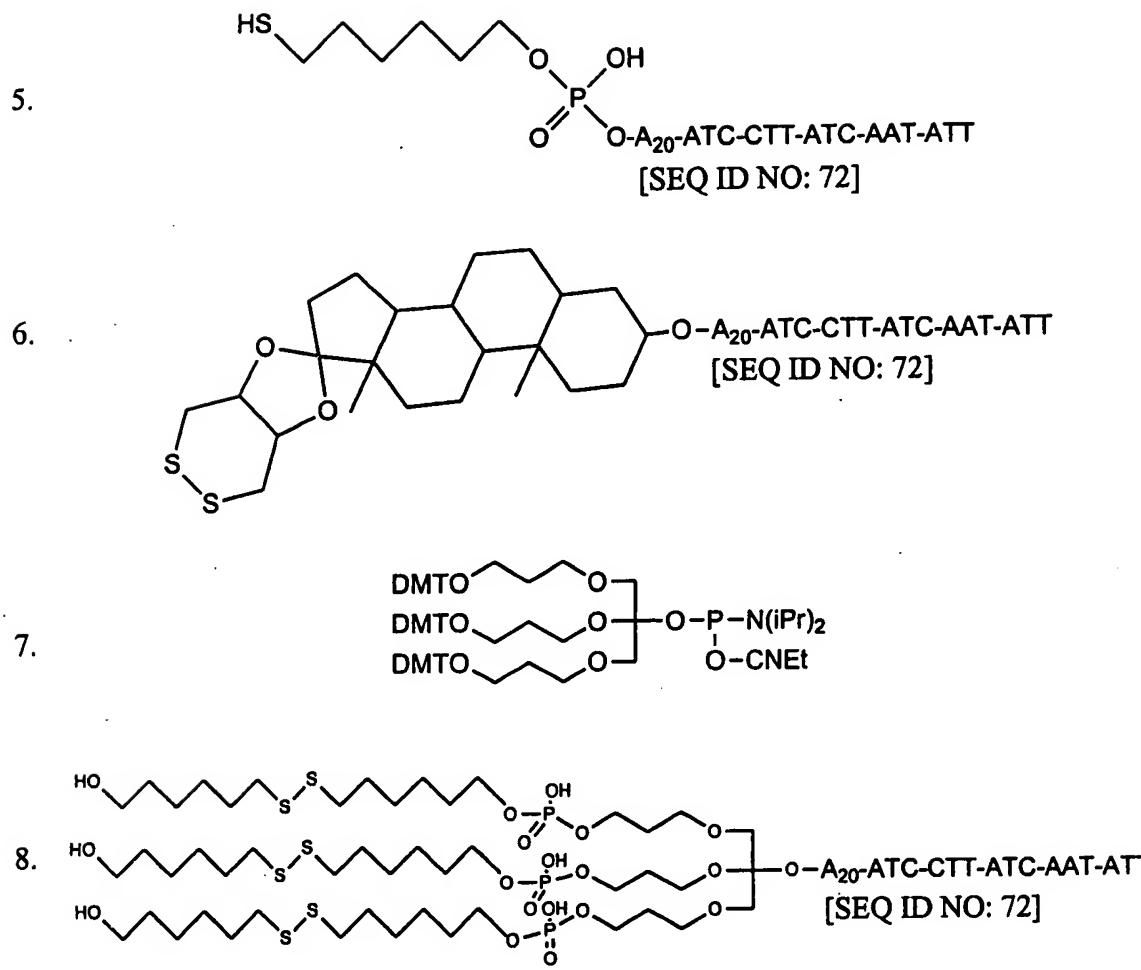
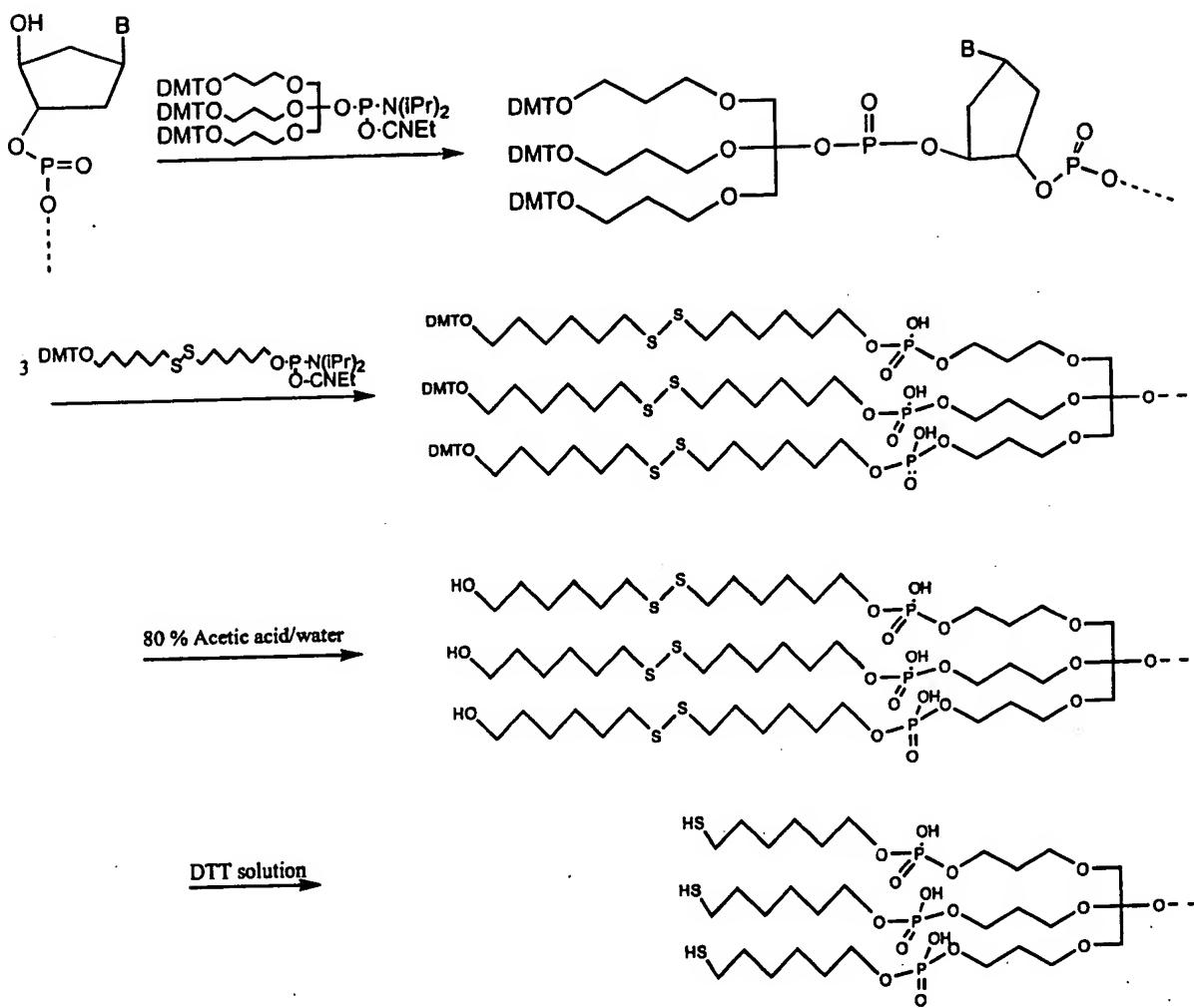


FIG. 46



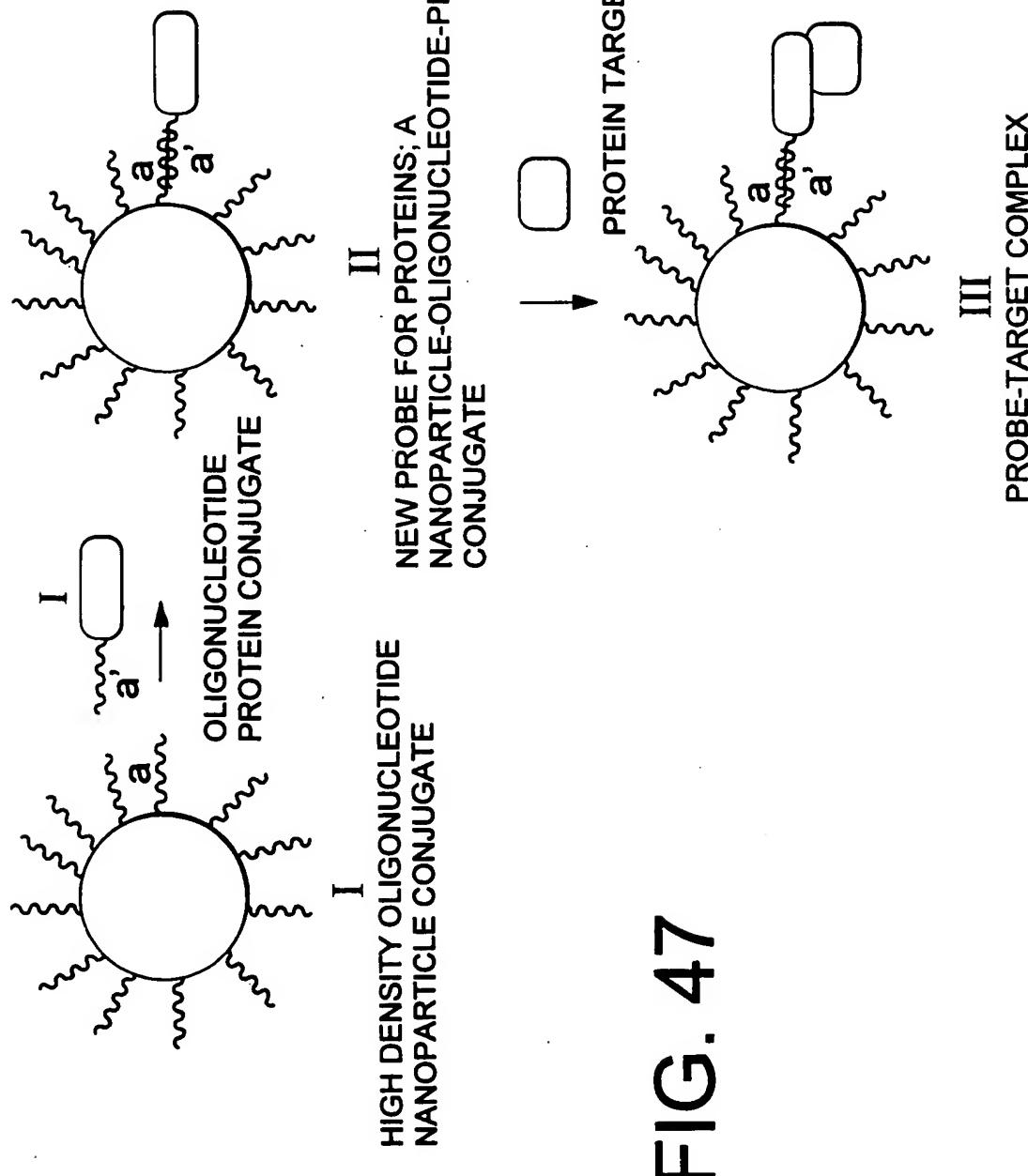
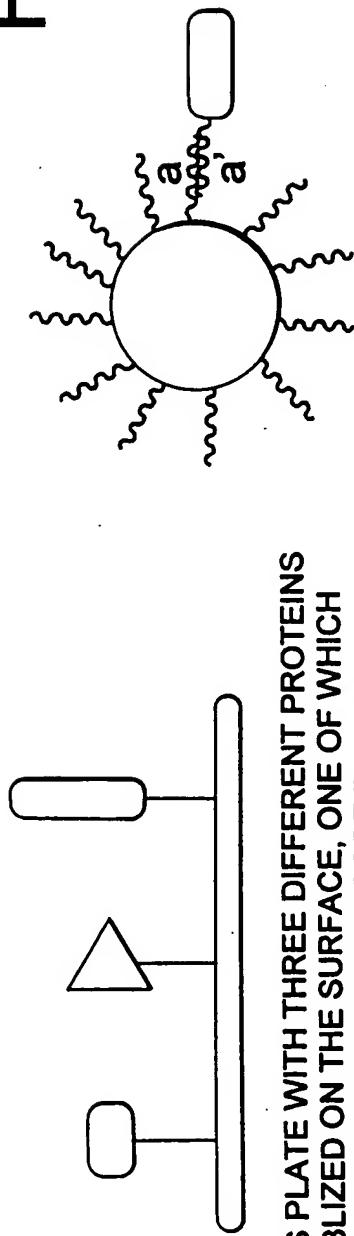


FIG. 48

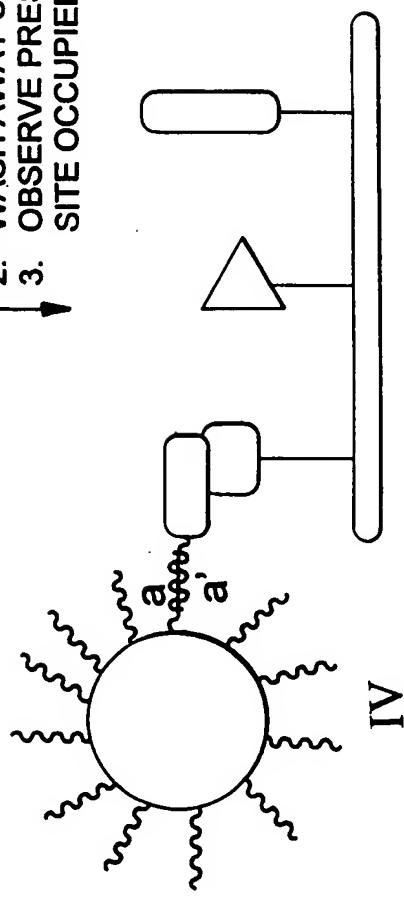


GLASS PLATE WITH THREE DIFFERENT PROTEINS  
IMMOBILIZED ON THE SURFACE, ONE OF WHICH  
BINDS TO THE PROTEIN IN PROBE II

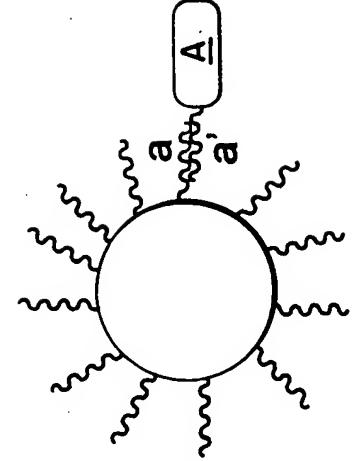
II

NEW PROBE FOR PROTEINS; A  
NANOPARTICLE-OLIGONUCLEOTIDE-PROTEIN  
CONJUGATE

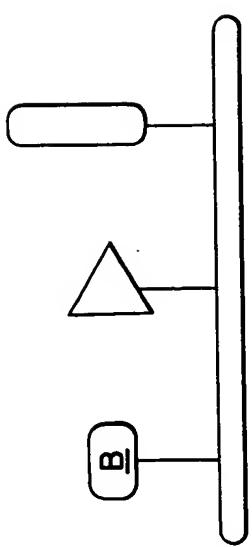
1. EXPOSE PLATE TO THE PROBE SOLUTION
2. WASH AWAY UNBOUND NANOPARTICLE PROBE
3. OBSERVE PRESENCE OF BOUND NANOPARTICLES AT  
SITE OCCUPIED BY THE FIRST PROTEIN IN THE SERIES.



IV



II'  
NANOPARTICLE-OLIGONUCLEOTIDE-RECEPTOR



GLASS PLATE WITH THREE DIFFERENT SUBSTANCES  
IMMOBILIZED ON THE SURFACE, ONE OF WHICH (B)  
BINDS TO THE RECEPTOR UNIT (A) IN II'.

FIG. 4.9

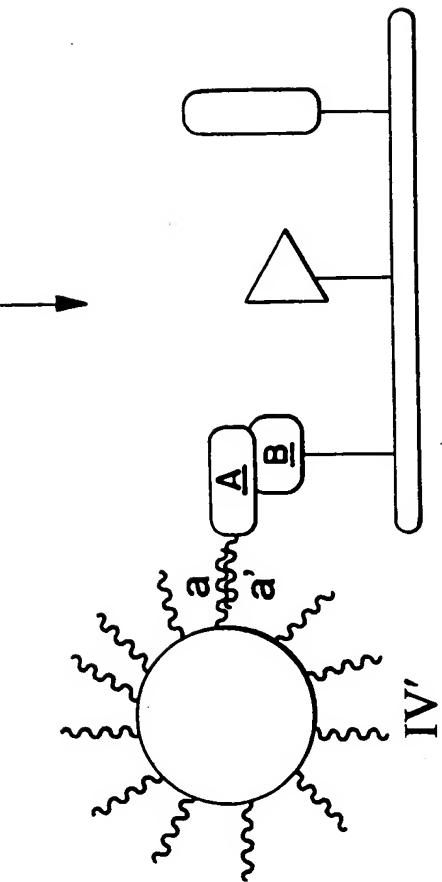


FIG. 50A

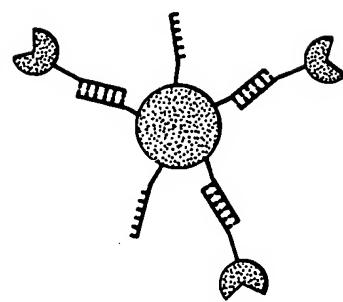


FIG. 51A

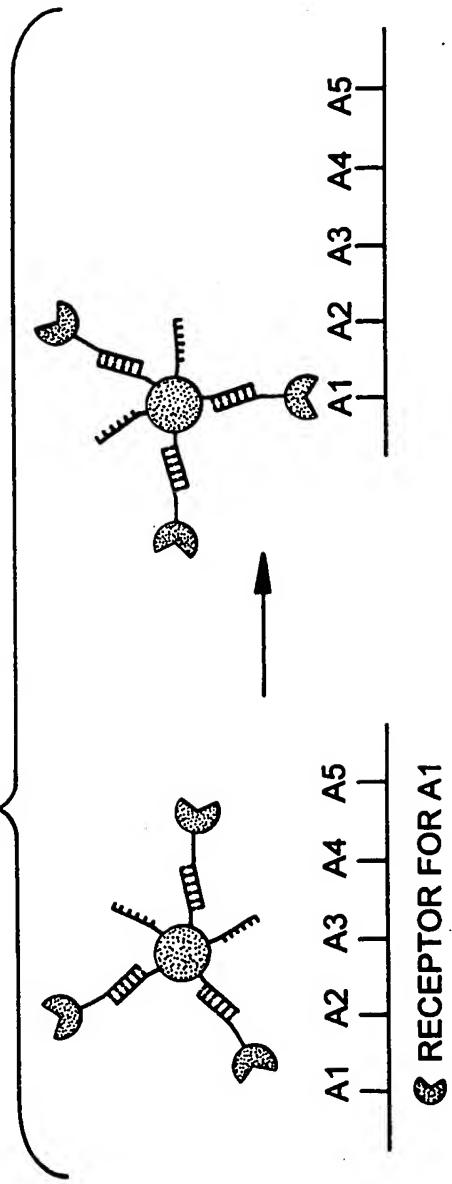


FIG. 50B

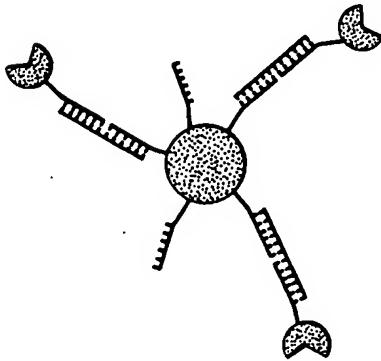
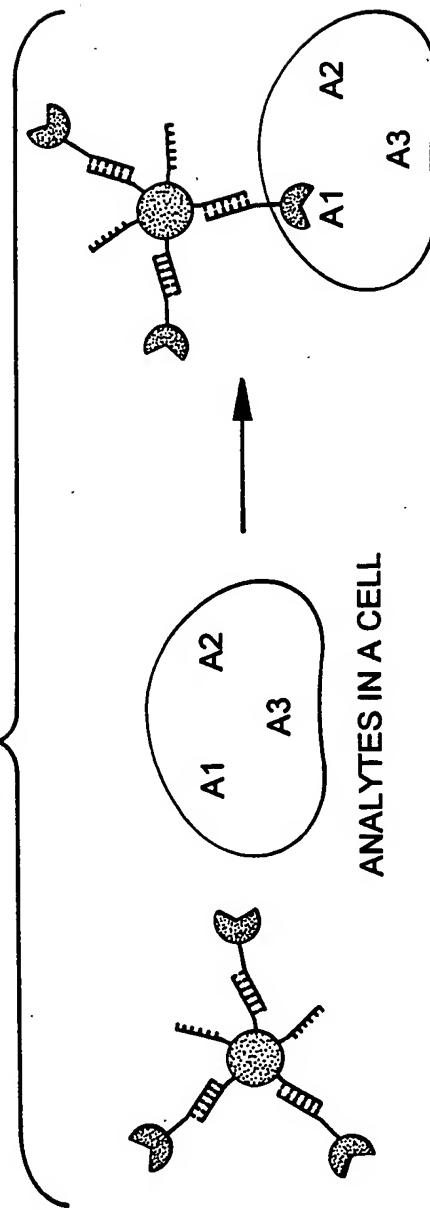
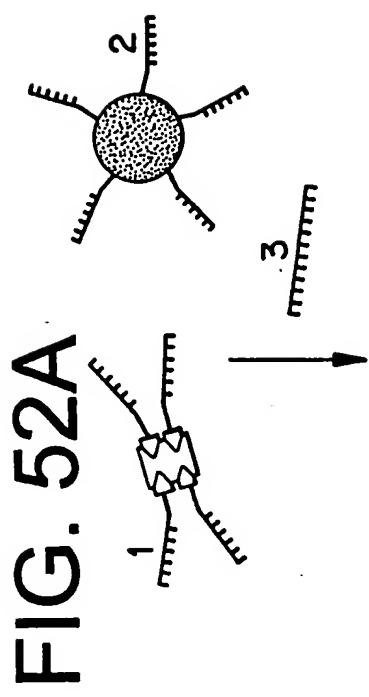
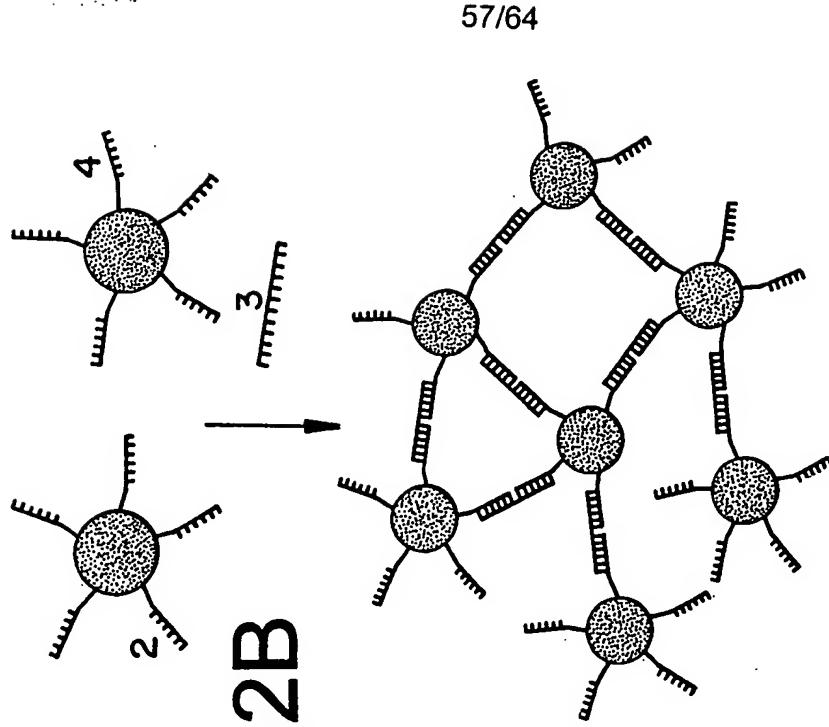


FIG. 51B





**FIG. 52B**



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1 3' biotin-TEG-A10-ATG CTC AAC TCT 5' [SEQ. ID NO. 73]  
 2 5' SH(CH<sub>2</sub>)<sub>6</sub>-A10-CGC ATT CAG GAT 3' [SEQ. ID NO. 74]  
 3 5' TAC GAG TTG AGA ATC CTG AAT GCG 3' [SEQ. ID NO. 75]  
 4 3' SH(CH<sub>2</sub>)<sub>3</sub>-A10-ATG CTC AAC TCT 5'

● 13 nm Au NANOPARTICLES    [ ] STREPTAVIDIN

● 13 nm Au NANOPARTICLES

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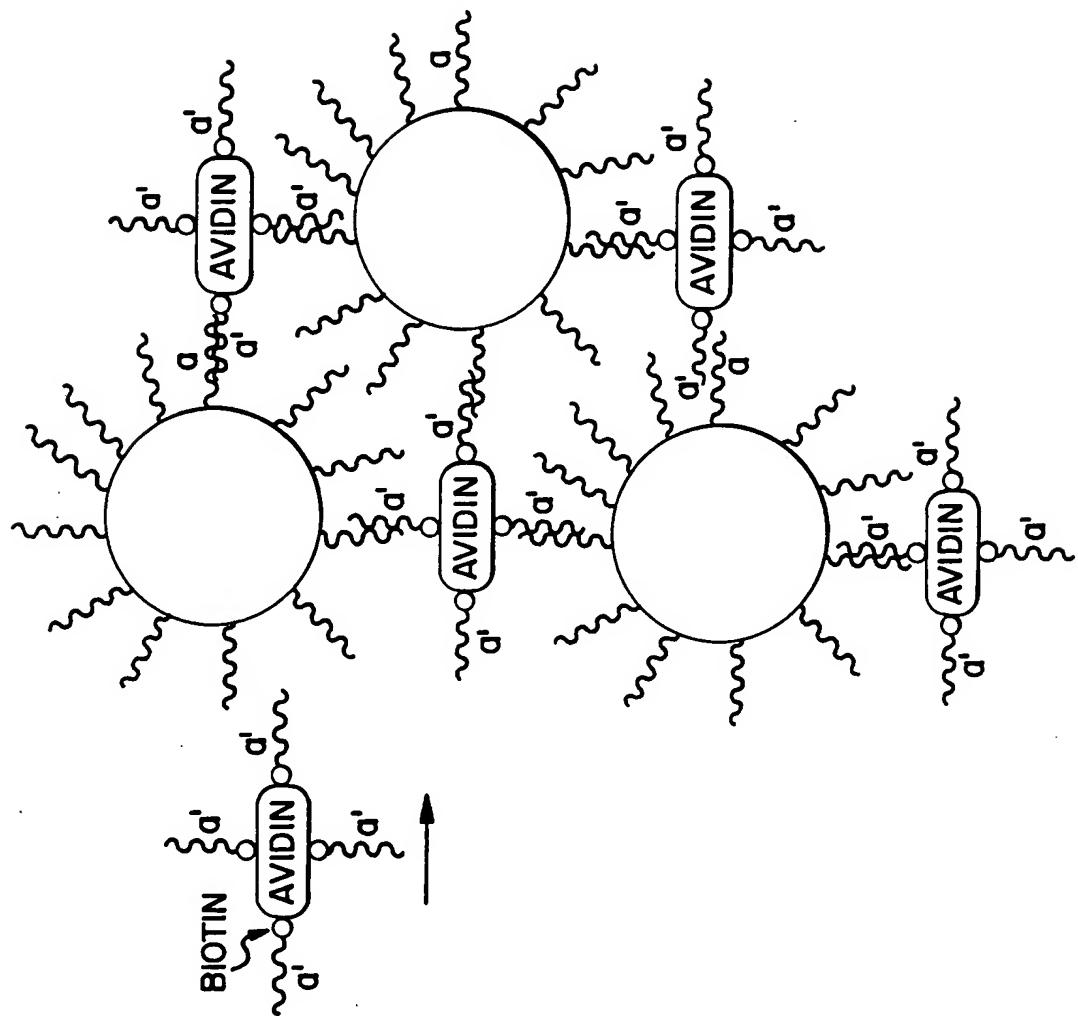


FIG. 52C

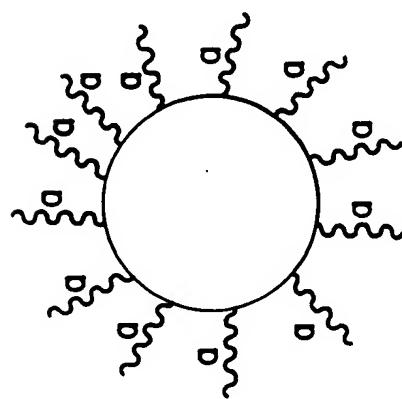
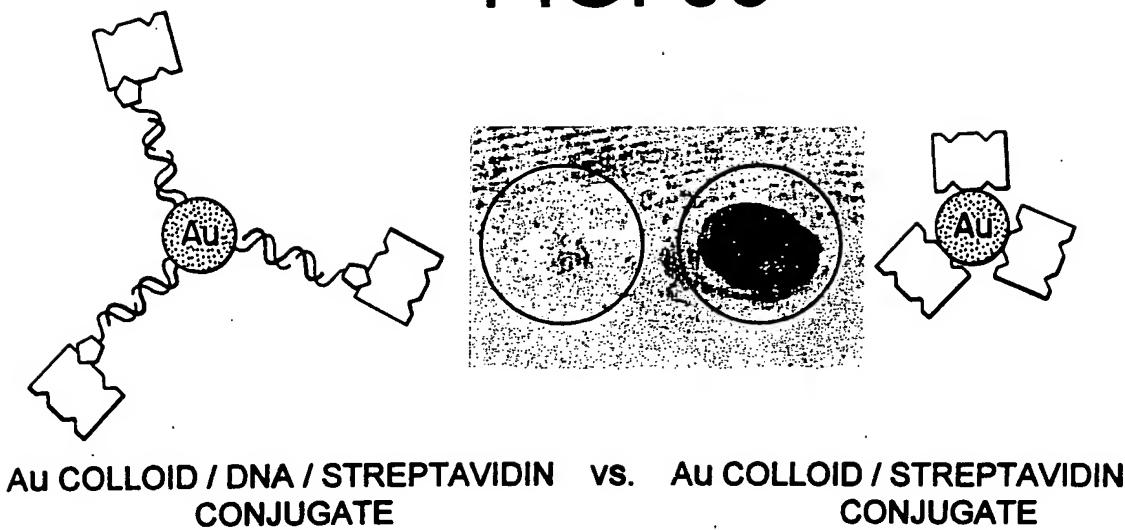


FIG. 53



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FIG. 54

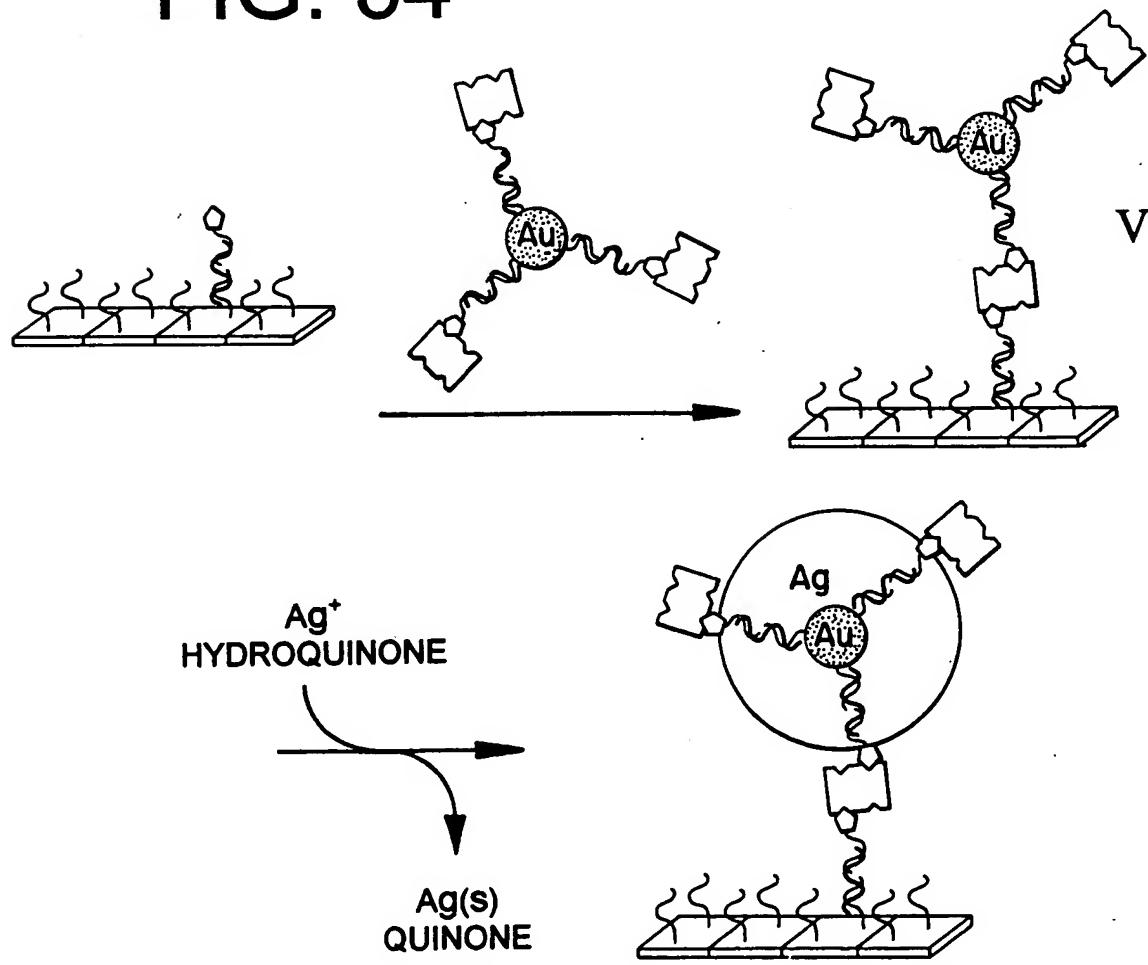


FIG. 55

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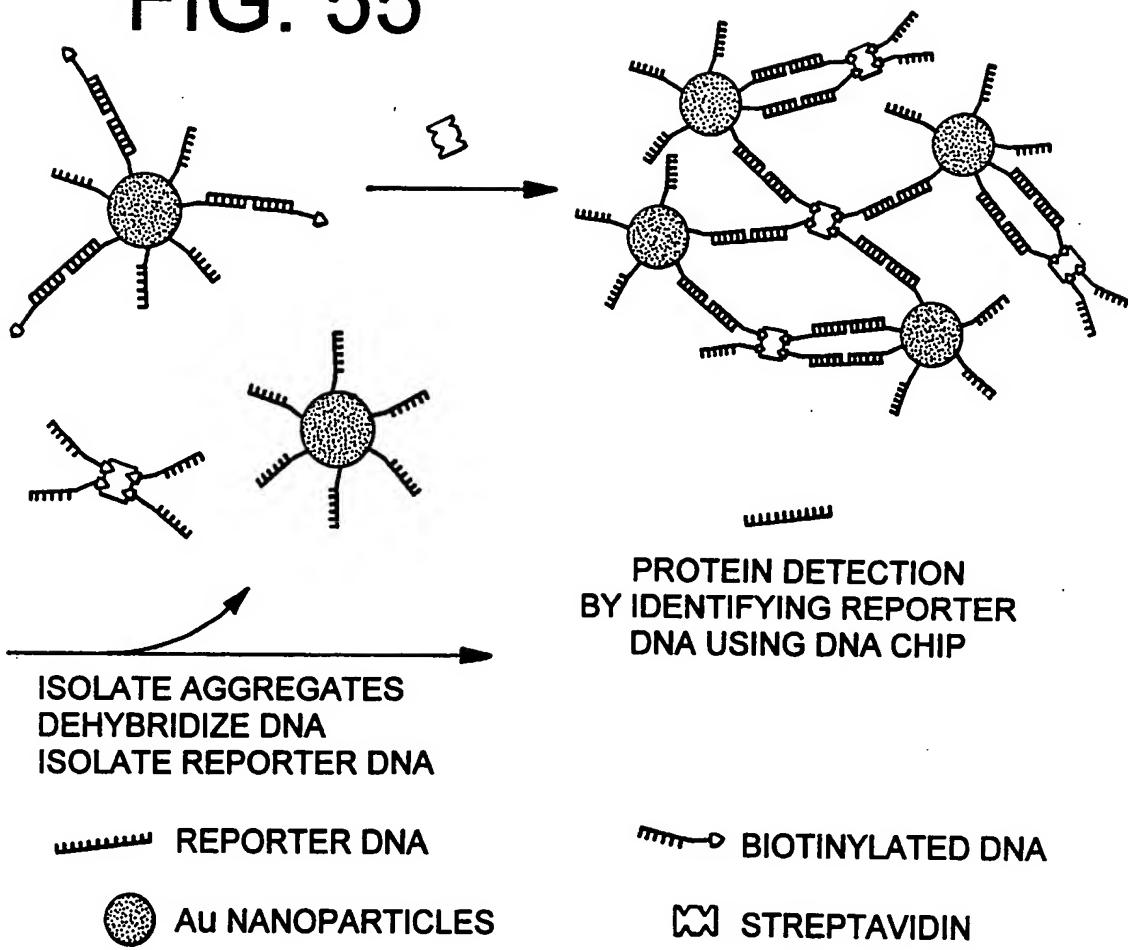
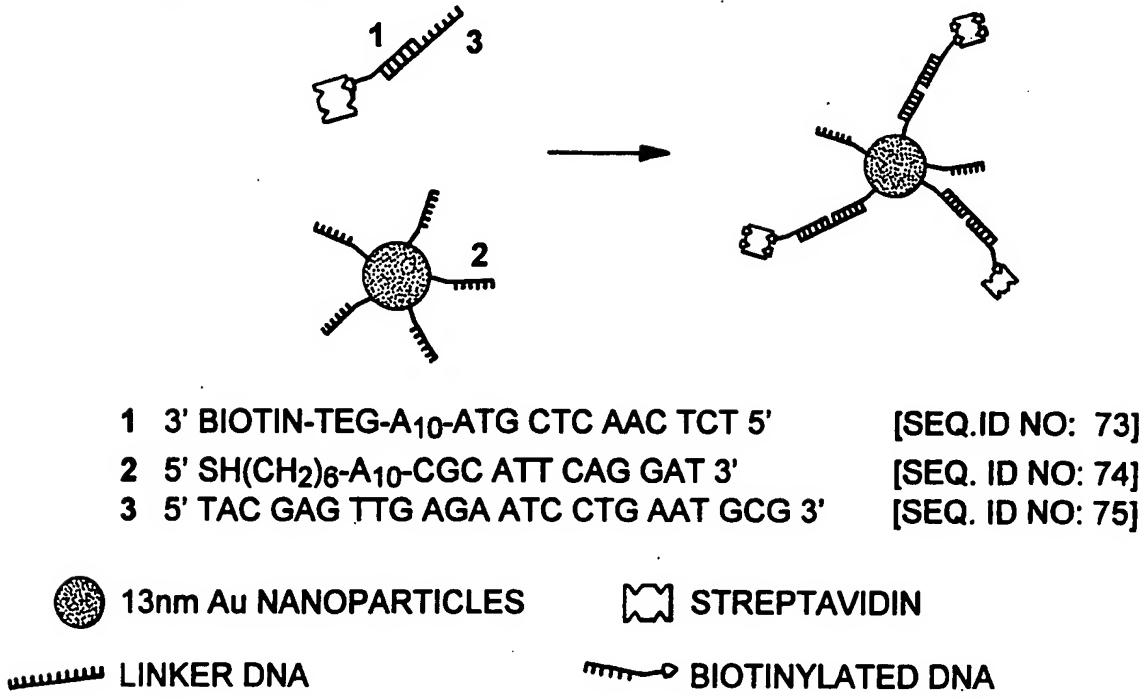
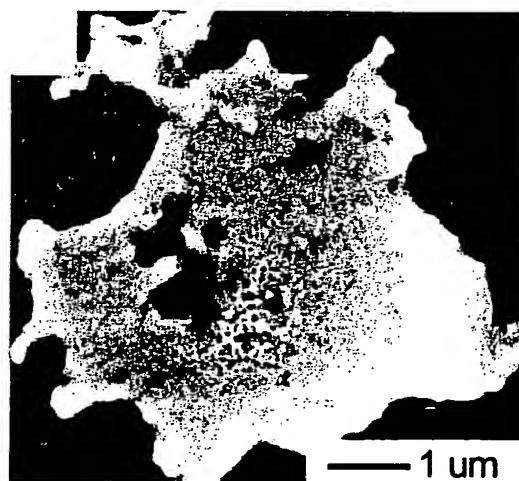


FIG. 56



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**FIG. 57A**



**FIG. 57B**

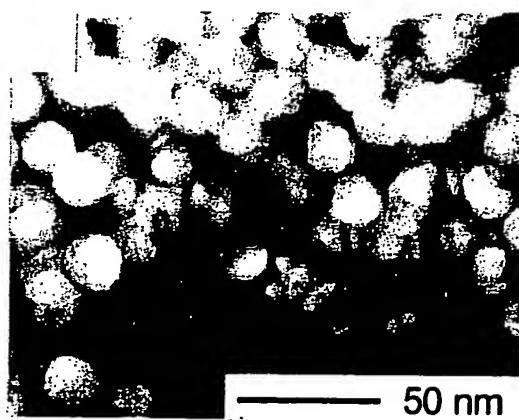


FIG. 58A

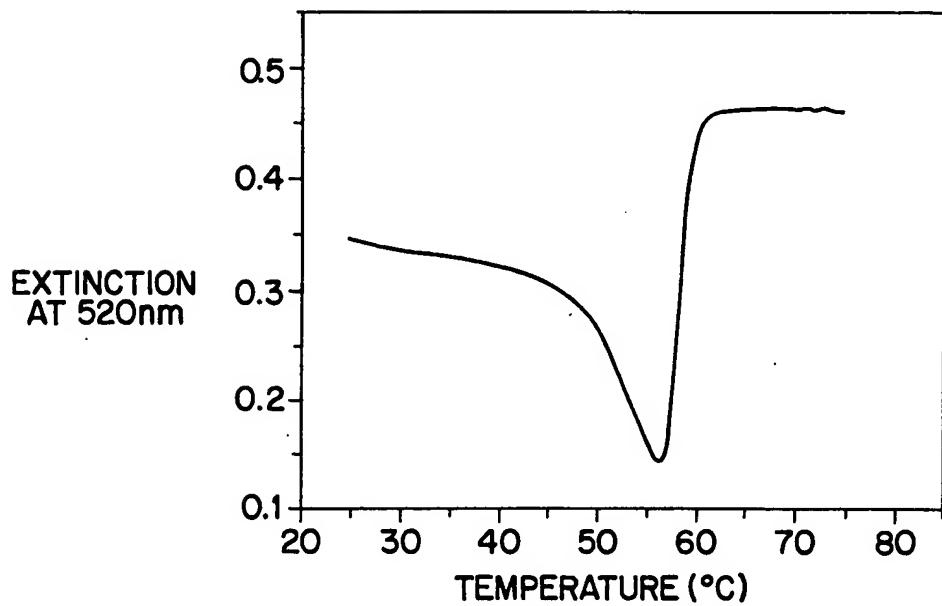


FIG. 58B

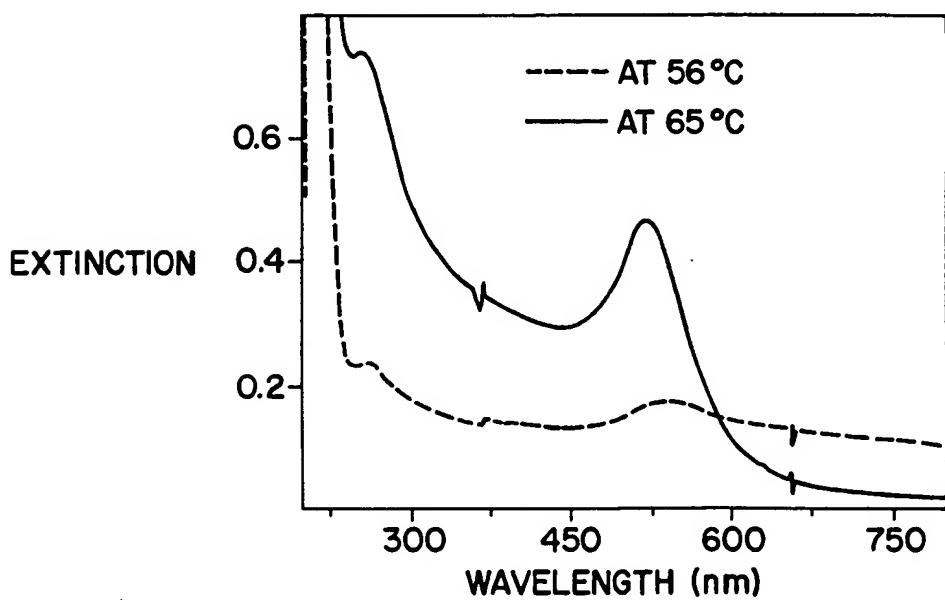


FIG. 59

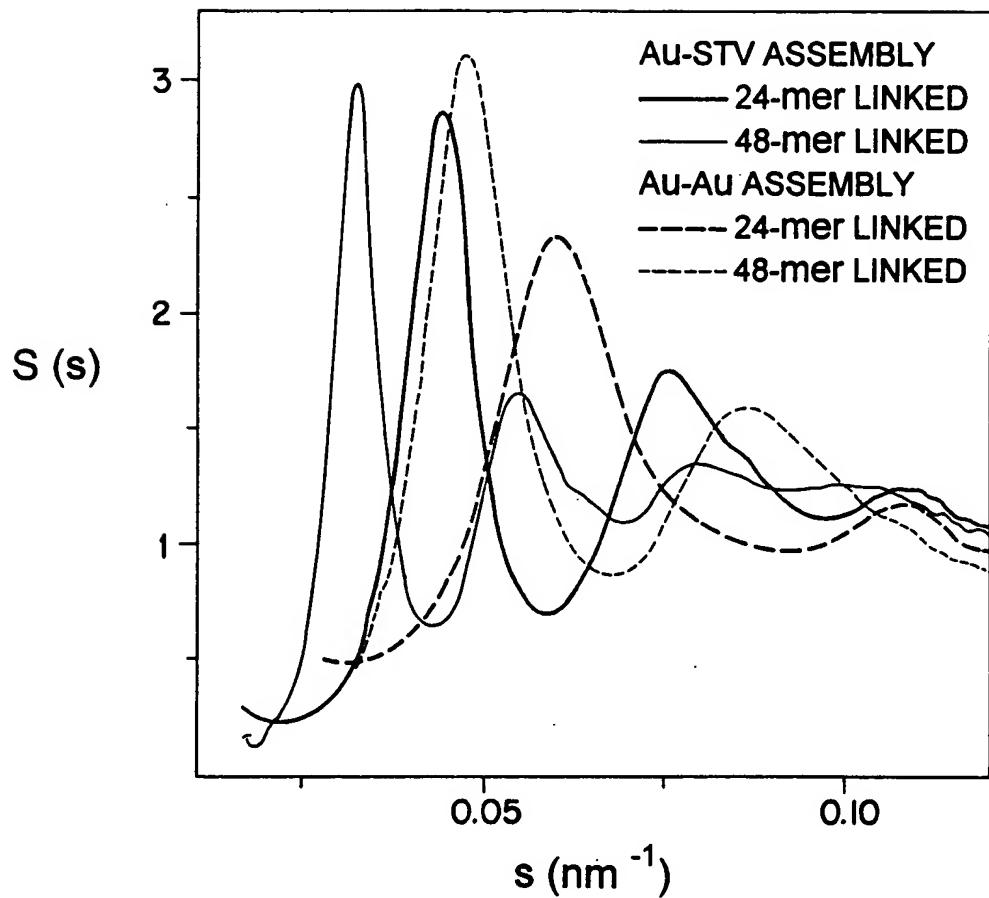
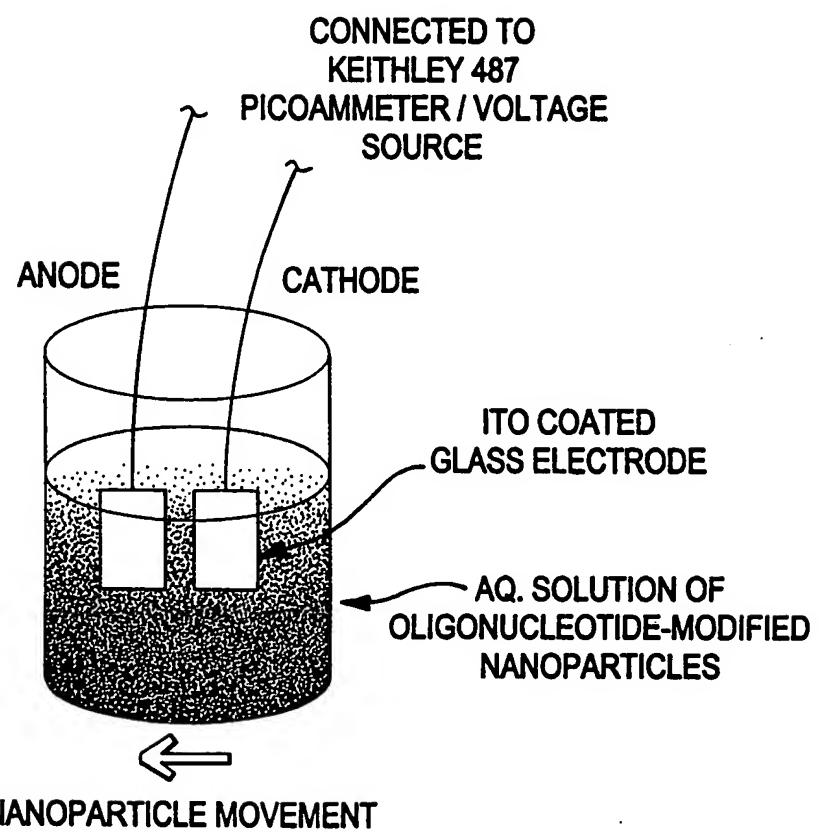


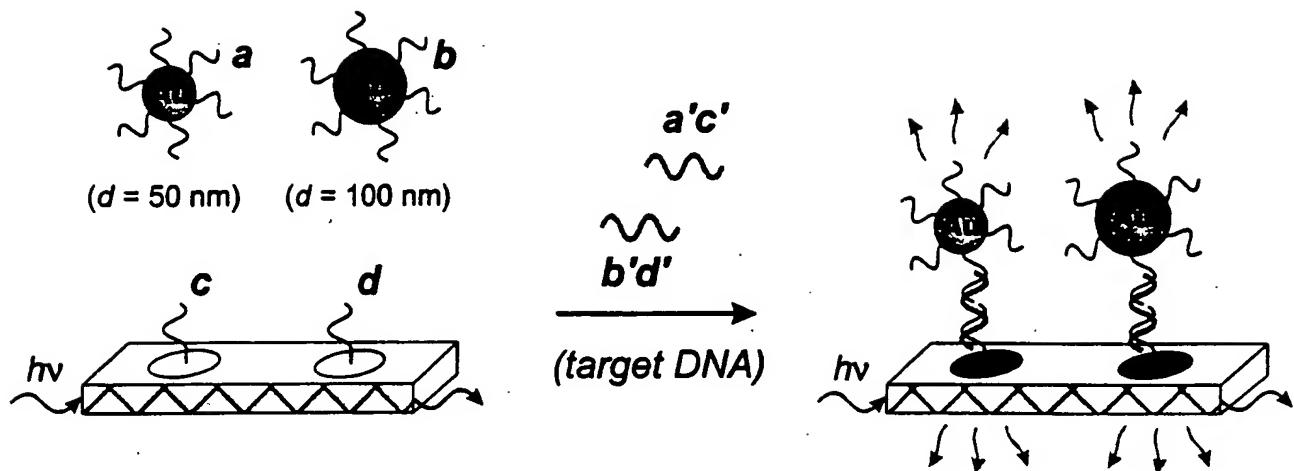
FIG. 60



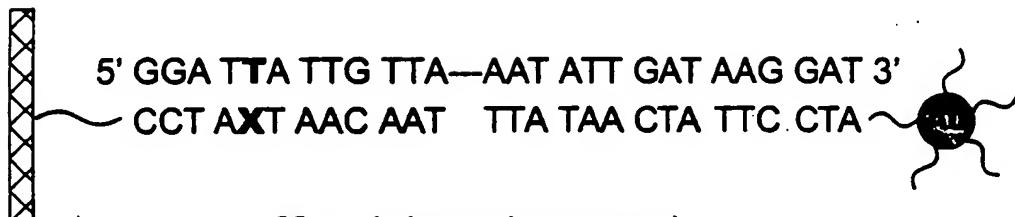
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Figure 6)

A



B



**X = A (complementary),  
G,C,T (mismatched)**

**Test for Target Sequence a'c'****Test for Target Sequence b'd'**

TOPOLOGY-DEPENDENT

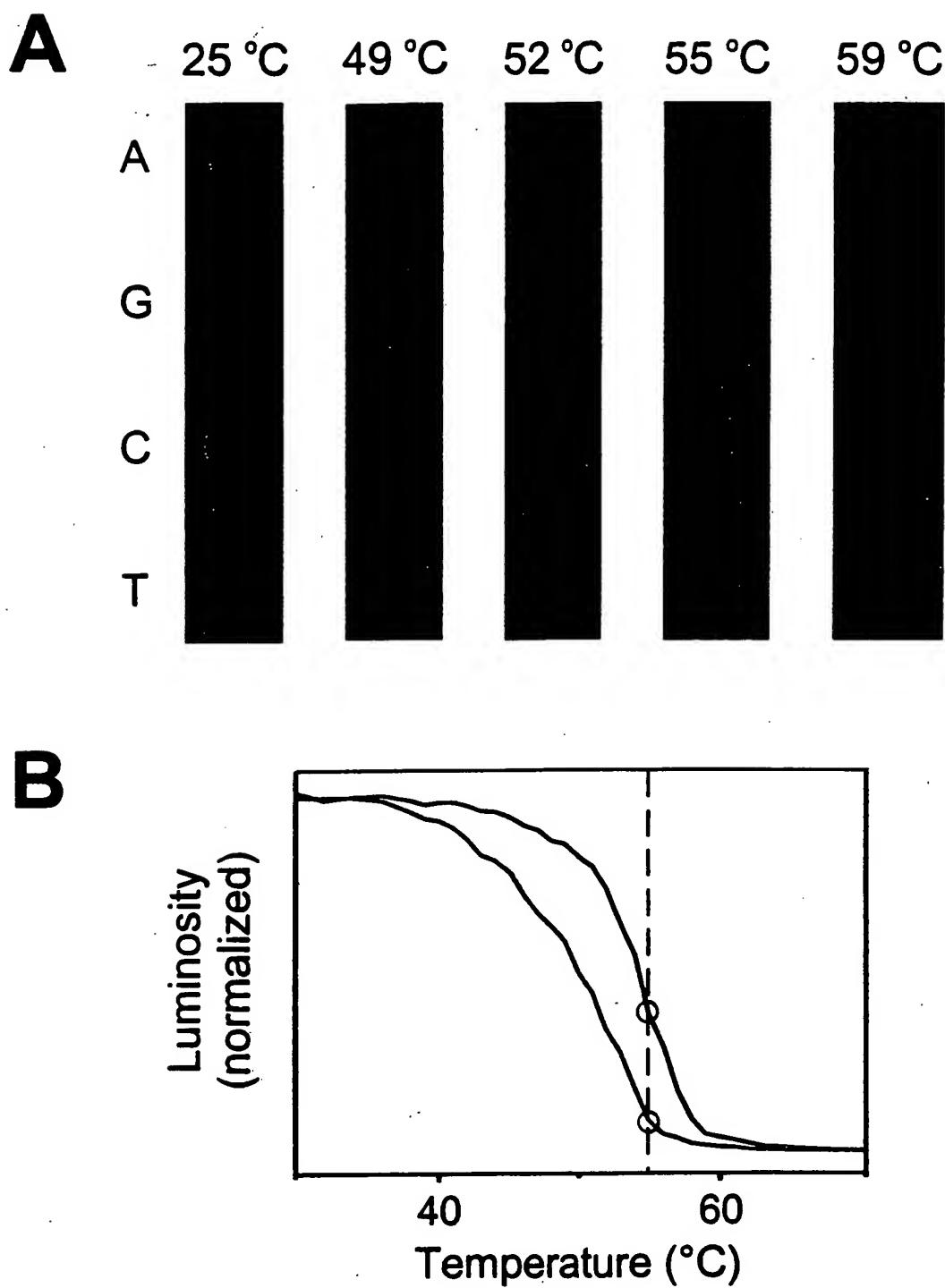
**A****B****C****D**

Figure 62

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Figure 63

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Figure 64

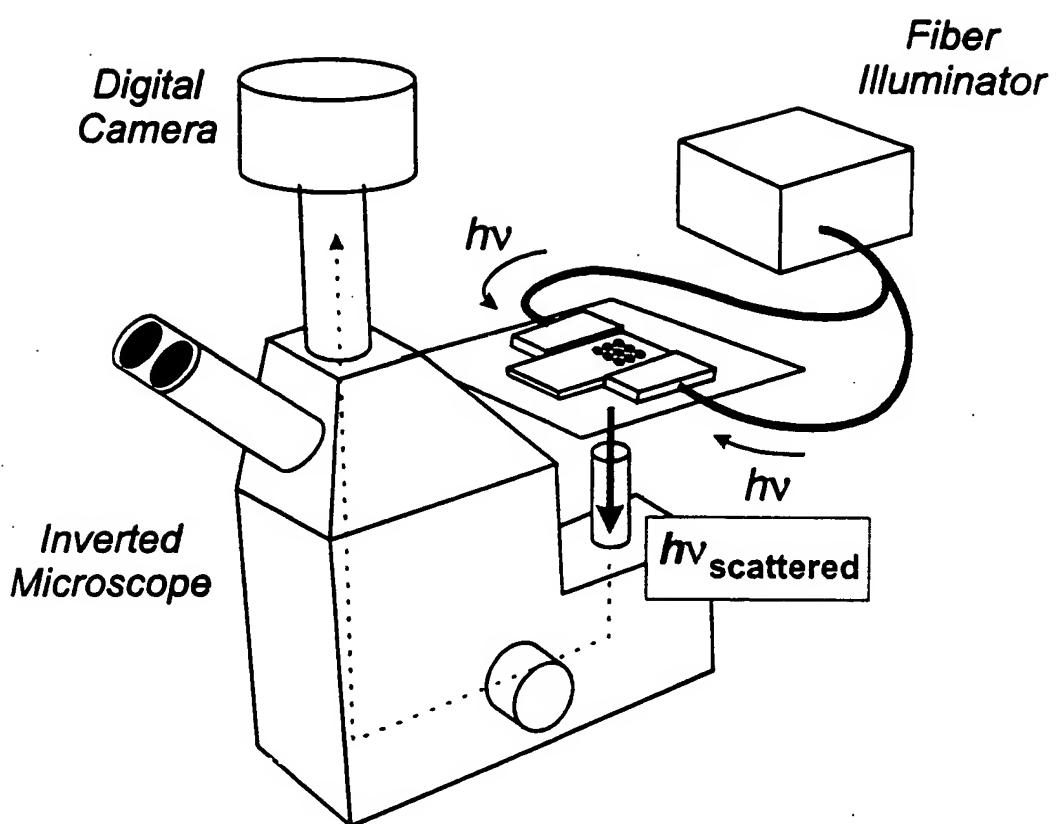
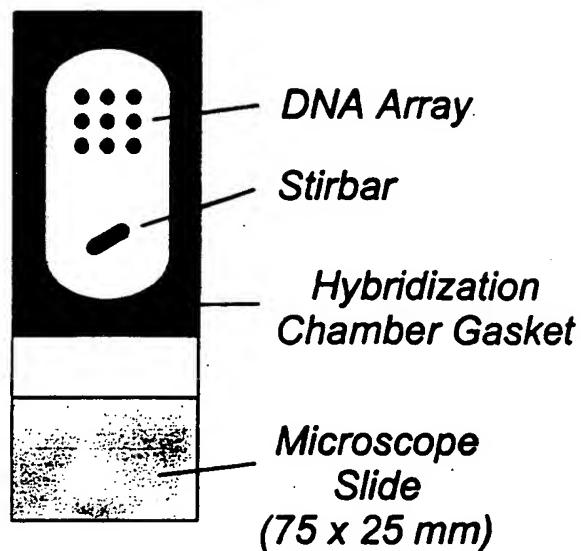


Figure 65

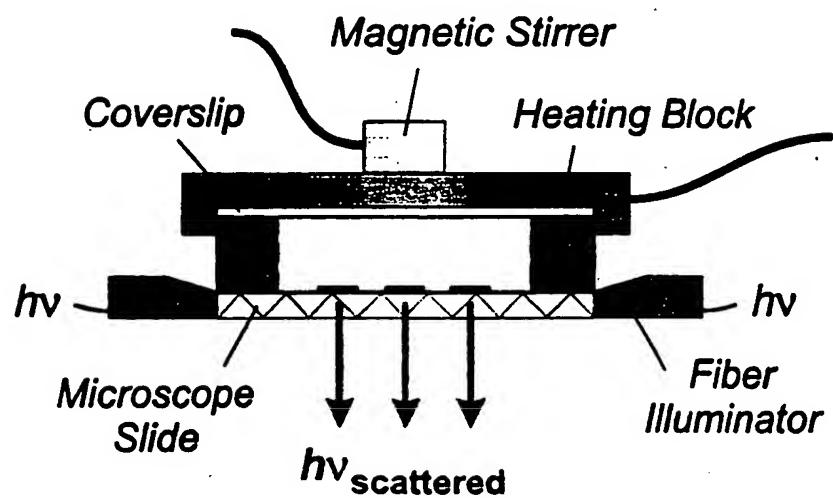
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59

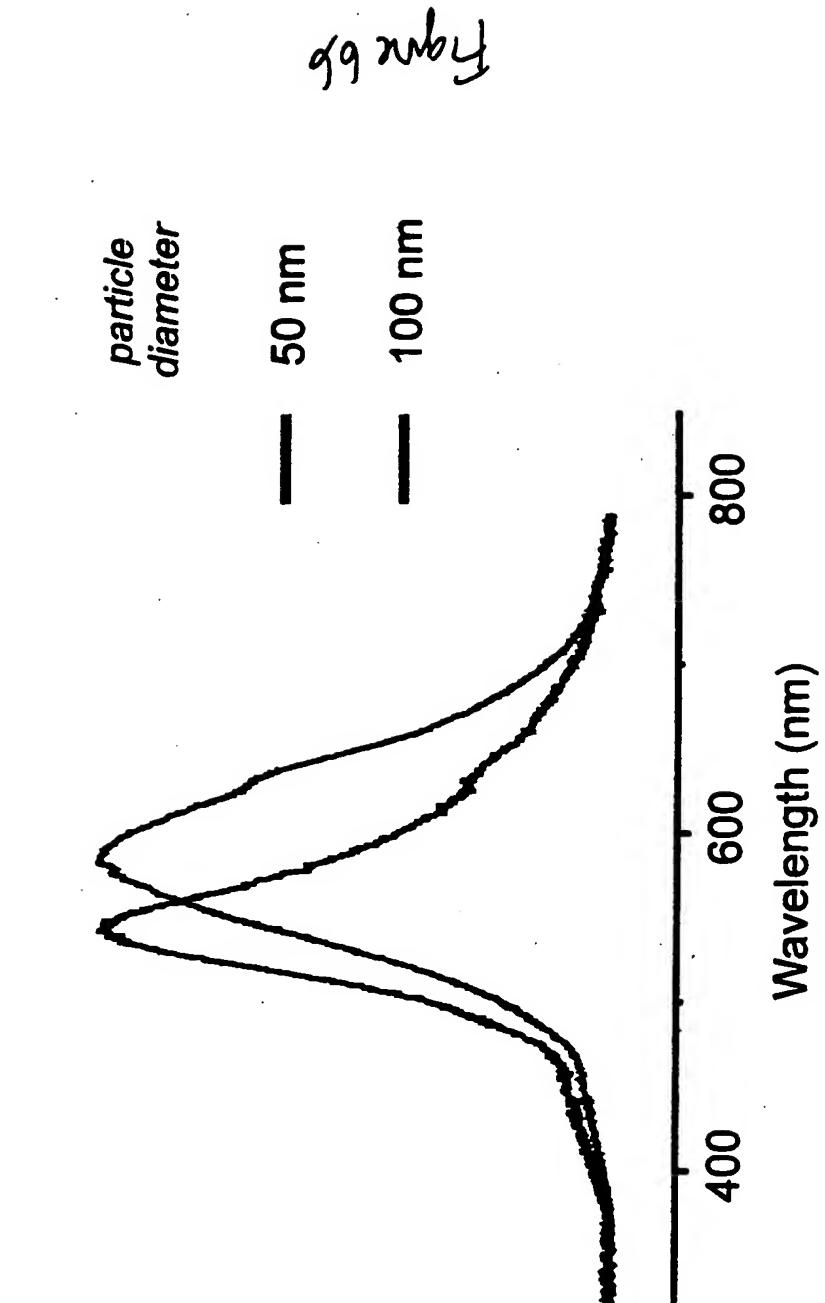
A



B



SCANNED, # 4



Scattered Light Intensity

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$\mathcal{H}/\mathcal{H}_1$

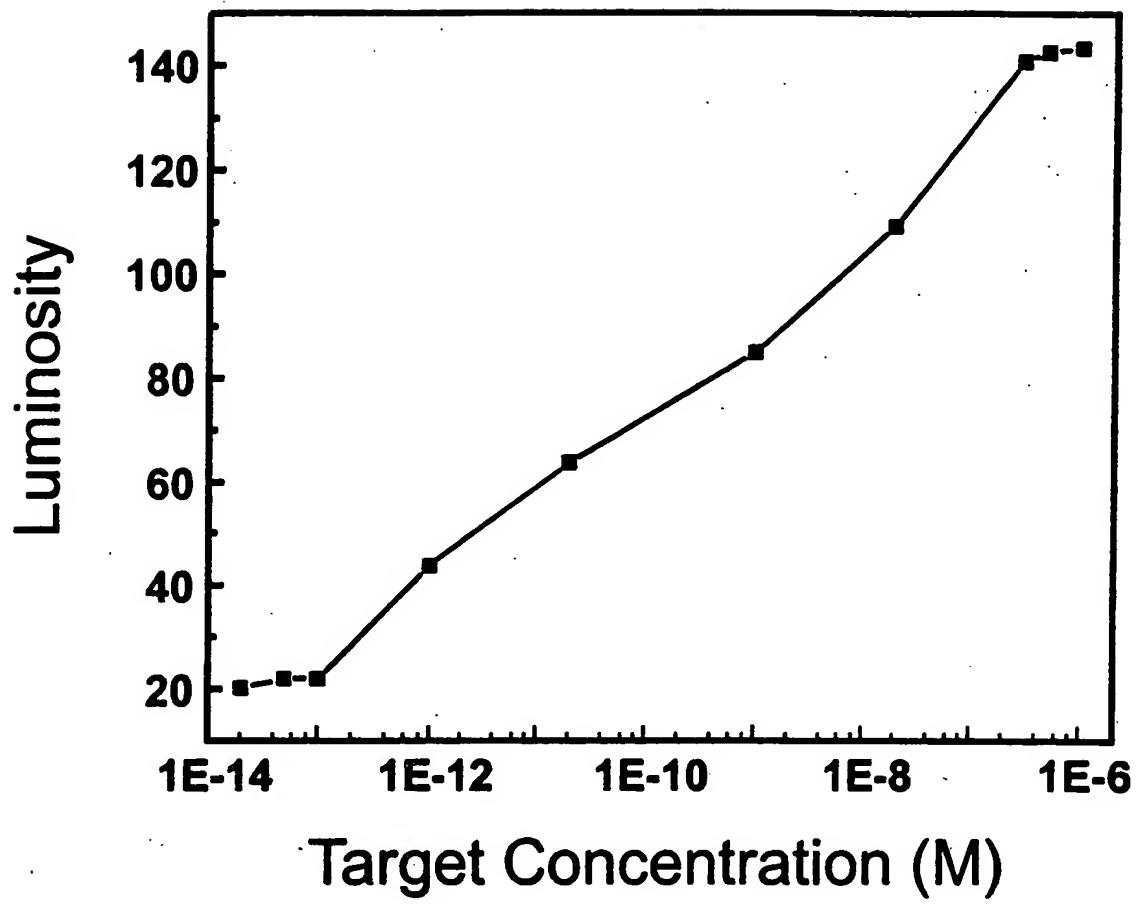


figure 67